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PLANNING DIVISION
MASTER PLAN SECTION

A STUDY OF

SUBURBAN CLUSTERS VERSUS URBAN SPRAWL

1963

SUBURBAN CLUSTERS OR SPRAWL

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SUBURBAN CLUSTERS OR SPRAWL

Introduction

The following pages indicate the desire of the Planning Staff to present for discussion its feeling regarding the development of the County's future land use plan. This effort is confined largely to the western two-thirds of the County, an area which will be the object of great impact in the next 20-40 years. The eastern third of the County, already committed to land uses under the adopted plan of 1958 for 1980, will need attention and revision as the need arises and as required by law every five years. The problems of land use planning in this area, however, are localized, and in most cases not impossible to cope with. In fringe areas such as Scott Run and the Upper Accotink area, effort is now being made to set the forces in motion to begin the "cluster concept" at the original community level. These areas were committed to public utilities services under the original 1958 plan, and bond issues have been sold for their servicing.

The "Western County area" then is defined as:

a. The Occoquan watershed (above the water supply), including Sanitary District 12.

b. The Upper Potomac watershed (above the water supply intakes), including Difficult Run, Surgarland Run, Horsepen Run, Nichols Run, Pond Branch, and Sanitary District 14.

c. The Pohick watershed.

These areas comprise the approximate 250 square miles of the western county area. The Board's policy, through its master plan and zoning policies in these areas, has, in the past, supported the theory of low-density (1 acre and larger) zones or lots. It has also strongly supported a policy of watershed and water supply protection. It is our goal, in this analysis, to support that policy, and to offer what we think are arguments for a proper physical plan for the area. This plan should accommodate the greatest number of people, in those areas, which can be best served by <u>all</u> necessary facilities. The form and design of the plan will be based on the policy selected by the Board of Supervisors. It is hoped that this report will assist in making that determination.

This booklet presents arguments on both sides of the question; pages 31 through 33 deal with some known disadvantages of the cluster policy. The appendix is made up of letters from the most affected departments, some in agreement, some raising questions. It must be pointed out that the letters in this report are constructive and extremely helpful in content. They are not intended to represent each department's <u>official stand</u> on the matter, but to inform the Board of their basic opinions. The Planning Staff fully appreciates the cooperation received during this study.

The Planning Staff completed its publication, "The Vanishing Land," in December 1962, as a report dealing with an important keystone of cluster planning, open space control.

From November 1962 to date, there have been fourteen meetings around the County, covering the subject of the policy plan for the future. The Board of Supervisors discussed it on January 9, 1963, and the Planning Commission on January 10, 1963. The Board asked, at that time, that this report, dealing with pros and cons of the subject, be prepared for its review and further discussion. The Board at its meeting of June 12, 1963, again discussed various planning policies and the completion of this report.

SUBURBAN CLUSTERS OR SPRAWL

The purpose of this report is twofold:

(1) To clear up some misunderstandings or misconceptions which many people have expressed regarding the Staff's thoughts on sprawl and also on Suburban Cluster planning, and

(2) To present in more detail the thoughts of the Staff on the savings to the taxpayer, under the Cluster Plan, of providing and maintaining the various services and utilities which are justifiably demanded by the citizens.

To discuss these two points in their respective order would be appropriate, in that it is mandatory that we all have a common understanding of just what we are talking about before we attempt to analyze the comparison of costs between two different policies of development.

PART I. GAINING A COMMON UNDERSTANDING

The first point which should be clarified is that the Staff is by no means attempting to downgrade or disparage the development that exists in the eastern third of the County. We are, generally speaking, very pleased with the quality of development which we have witnessed to date. Our concern is of a different - a much larger - scale. It is the realistic possibility that hundreds of subdivisions of various sizes will be planted on the landscape in such a manner that they will completely dominate the land, leaving undeveloped pockets here and there which may remain open but more probably will be developed and filled in at some later date. Thus, it is the idea that the undeveloped watersheds in the western part of the County could be, under existing policies, completely covered by these hundreds of subdivisions, placed side by side and end to end, referred to by the Staff as "sprawl." Springfield, for example, is not "sprawl," but the future development of subdivisions adjacent to Springfield, into the Pohick watershed, and on throughout the rest of the County, would make Springfield a part of "sprawl." The Staff is convinced that such a policy of development is not the best policy to follow, and has thus recommended the suburban cluster type of development for the undeveloped portions of western Fairfax County.

This leads us to a second point which must be explained. It has been suggested that the Suburban Cluster Plan is actually an apartment plan, proposing a greater number of apartments in the County. This is not so. We are not proposing a higher ratio of apartments. We are merely suggesting that the best location for apartments is within the center of these clusters, and that a policy should be adopted and adhered to in the rezoning for apartments only at these points. Apartments will play a major role in the structuring of a cluster, and are more logically suited around the commercial activity. The rather carefree development of apartments scattered throughout the County, even at locations where they might meet the criteria, will only enhance the growth of sprawl. Thus, the Suburban Cluster Plan simply suggests a more logical location for apartments, not more of them.

A third misunderstanding has been the suggestion that the Staff is endorsing a policy which would deter the development of subdivisions having R-12.5 and R-17 densities. The point is that we do want to continue providing subdivision development - we are well aware that this type of housing is in greatest demand, and we are not suggesting that we abandon this type of residence in favor of town houses or apartments. We suggest that under the Suburban Cluster Plan, subdivisions of medium density be more logically arranged as part of a suburban cluster, somewhat contained, but not eliminated. Such an arrangement of apartments and other high-activity uses in the center of these suburban clusters, surrounded by medium density, will allow for a more prominent setting for larger lots, estates, small farms, and other forms of open space which are now, and will be, in increasing demand. Thus the adoption today of a policy of cluster planning will enable the residents of tomorrow to choose the type of residential environment they prefer. The Suburban Cluster Plan will provide this choice; sprawl will not.

The suggestion has been made that once the designed saturation point has been met by the growing population, it is likely that the open spaces in between the clusters will be developed because of economic pressures. This is a possibility even with a conscientiously administered open-space program. But since the same number of persons would be accommodated under either development plan - cluster or sprawl - it is pointed out that when the population saturation point is reached in about, say, 1995, if cluster planning had been adhered to, then a choice will be available in 1995 as to whether to "fill in" the open spaces or enlarge the existing clusters; under sprawl development, the only choice will be to develop the remaining "pockets" of open land, thus blanketing the land with development. Furthermore, until the population saturation point is reached - some 20-30 years - the citizens of Fairfax County could enjoy the proximity of open space under the cluster plan; under sprawl, one would have to drive far westward, much as the population of the eastern third of the County does today, before reaching the rural open spaces. Thus under cluster planning, the citizens of today can enjoy nearby open spaces, and the citizens of tomorrow can have a choice in the manner they choose to accommodate the growing populace.

There is some question in the minds of many as to what the Staff proposes for such developed areas as Fairfax, Vienna, McLean, and Springfield. How can they be made into clusters? The answer is that they cannot be clusters in the true sense of the term, but with the careful, logical rezoning for apartments, industry, and commercial activity, and the containment of the existing small-lot subdivisions, they could very well take on the advantageous aspects of clusters, enhancing the possibility of keeping the undeveloped and low-density areas between them as low-density areas and open land. It is not too late, in our opinion, to keep some open spaces in the Upper Accotink watershed, for example. For the present, a firm rezoning policy could accomplish this. The failure to act promptly on this matter, however, will result in the heavy development of the land lying between the Potomac River on the north and McLean; McLean, Tyson's, and Vienna; Vienna and the City of Fairfax; and between the City of Fairfax and Springfield, thus blanketing half the area of the County with total development.

This leads us to the clarification of one other misconception - that being, what will the suburban clusters of the western part of the County be like? Reston, a planned community housing 65-70,000 persons in its immediate area, surrounded by large lots, estates, and small farms, is a good example of what other proposed clusters could be like — a variety of housing needs provided in a planned setting in relation to a major road plan, topography, and other land uses. Such a cluster could be planned in other appropriate areas of the County, but not of necessity in an RPC (Residential Planned Community) zone. Good, sound, comprehensive and detailed planning, the strong adherence to an adopted policy, and the provision for some flexibility within an established framework could yield the desired results. It would take the strong effort of all concerned to effectuate such a policy, but the results would certainly compensate such effort.

Another point deserving attention is the possibility of mass transit in the future. To reiterate a statement that has already been made in previous reports - suburban cluster planning promotes the establishment of a sound, well-functioning transit system that can serve the majority; sprawl development will make it impossible for mass transit to function optimally and serve the majority. The existing doubtfulness of mass transit, however, does not suggest that we should defer the endorsement of the cluster policy, for such policy is also directly geared to our freeway system, which is more realistic to many people today. Thus, the cluster policy is recommended either with or without mass transit, in the light that with a mass transit system the suburban cluster policy should, in fact, be endorsed.

The discussion of one last point will climax Part I of this report. This point is that we should seriously consider the possible change of development policies of today. Today, the major roads, the installation of sanitary sewers, and the resultant rezoning applications by developers and speculators dictate how our County is to develop. If such policy is continued, then large-scale master planning must bow out of the picture. The pressure will be just too great. But if the planning of major roads and freeways, the design of sewers, and the resistance to speculation could all be geared toward an adopted land use policy, then through master planning we could achieve a more desirable development pattern for Fairfax Counry. We could plan for the orderly growth of the County, providing for all types of land uses dependent upon the popular demand, providing the appropriate environment for apartments, small-lot subdivisions, large-lot estates, and commercial and industrial uses. The question is, then, should a master plan prescribe the future development of Fairfax County, or should the location of major roads and freeways, the installation of sanitary sewers, and the request of the speculator? The present 300,000 residents of the County and the future 900,000 should receive an answer. The decision should be made today before there is little to be decided upon tomorrow.

To make such a decision, however, one would like to be acquainted with all possible advantages and disadvantages. Part II of this report elaborates on the possible economic advantages of adopting a suburban cluster policy, which also points out the economic disadvantages of sprawl development. We have suggested in previous reports that such a policy would result in the savings of cost for the provision of services and utilities. The following section discusses in greater detail the fact that suburban cluster planning would be cheaper to the County taxpayer and would promote a more efficient administration of County facilities.

PART II. SAVINGS ACCRUED UNDER THE SUBURBAN CLUSTER PLAN

SUMMARY SHEET
Balance of Savings

Page	Topic	Savings	
		Suburban Cluster	Sprawl
	Sanitary Sewerage		
	Total cost	Yes	
	Per capita cost	?	
	Storm Drainage	Yes	
	Roads	Yes	
	Parks	Yes	
	Schools	Yes	
	Libraries	Yes	
	Police	?	?
	Natural Resources	Yes	
	Fire Protection	Yes	
	Water	Equal	Equal
	Gas, Electricity, Telephone	Yes	
	Recreational Programs	Yes	
	Hospitals	Yes	
	Substation Branches	Yes	
	Refuse Service	Yes	
	Mass Transportation	Yes	

PART II. SAVINGS ACCRUED UNDER THE SUBURBAN CLUSTER PLAN

It must be clearly understood from the start that the following is by no means a detailed cost comparison between Suburban Cluster and sprawl development. Such a desired comparison would take considerable time from all of the various departments and agencies involved. This report is only an elaboration of a statement which was made in the preliminary report of several months ago entitled Western County Development Policy:

"The savings in cost of small sewer spurs, drainage facilities, roads, school buses, police and fire protection, etc., should be apparent."

The statement was directed toward a suburban cluster development policy.

In the endeavor to justify this statement, the Planning Staff has thoroughly analyzed the potential savings, obtained certain average cost figures used to illustrate necessary points, and contacted various persons specialized in their respective fields for their personal viewpoints on this proposed development policy. The study itself and the presentation of the findings have been conducted in an objective manner because it is felt that the figures and facts will speak for themselves, substantiating the validity of the statement under question.

Now, hopefully with a better understanding of the concept under consideration, let us analyze the potential savings of a suburban cluster development policy.

SANITARY SEWERS

Before discussing the savings of providing sanitary sewer facilities under cluster planning, it is necessary to analyze the Board's policy regarding the installation of these facilities. Only with an understanding of this policy and the direct results of it, can we intelligently compare this current policy with any possible alternatives.

*The Policy Today. The existing Board policy for the installation of sanitary sewers is to design the system to accommodate an average of ten persons per acre, or higher densities in areas it is assumed will receive a heavier impact than R-12.5 zoning (ten persons per acre). Employing such a policy on a countywide basis, Fairfax County could accommodate a population of 2 - 2.5 million persons. The projected population for the year 2000 is only 900,000. It can be concluded that under such a policy the people of today are paying for a sanitary sewer system that, when completed, could accommodate persons not expected until many years after the year 2000. Some might say that this is being "farsighted," but an analysis of this policy points out that this is not so:

(1) The County does not and will not grow at an even ten-persons-per-acre. The highest and best uses for varying areas range from parks, conservation zones, farms, estates, large-lot development, medium-density subdivisions, to high-density apartments, commercial, and industrial uses.

(2) Under the present policy, it is often a hit-and-miss proposition in providing sewers large enough for ultimate high-density development.

(3) Vast areas in the County, many already firmly established, are best suited for parks, estates, and other low-density uses, both in terms of today's development and that of the future, and in such areas it is a waste of the taxpayers' money to put in sewer facilities which are designed to accommodate a greater population than that anticipated under the adopted master plan.

(4) Thus, under existing policies, natural low-density areas might have an overdesigned system, and in future high-density areas there might well be an underdesigned system, necessitating either parallel trunks or a possible future new system.

(5) Experience under the existing Board policy has proven that the requests and approvals for rezonings of a higher-density usage go hand in hand with the capacity of the sewer system. It seems only logical that such rezonings should continue to occur until the sewer system has an average of ten persons per acre, for if a system is designed for ten persons per acre, then such number should ultimately be planned in order that the pro rata share of the cost of the system will be at the desired minimum.

(6) Therefore, the policy forces out the probability of any density less than ten-persons-per-acre (R-12.5) in all watersheds having sewer, because such density is needed to pay for the enlarged system.

Because of all of these built-in drawbacks in the existing Board policy on designing sanitary sewers, two alternative policies are suggested for the future design of this facility. Both alternatives could present a definite savings to the taxpayer; both alternatives, if adopted and employed, would be very instrumental in bringing about the realization of a development policy such as the Suburban Cluster Plan; and both alternatives would be designed to relieve the pressure for higher-density development in natural, desired low-density areas, and promote the establishment of high-density areas in places where they can best be accommodated from the standpoint of land use planning.

The failure to seriously consider these two alternative policies will result in the failure to effectuate a desired long-range land use development policy. We cannot deny the fact that the installation of sanitary sewers has the most direct impact on the development of an area. Therefore, we must make up our minds now as to whether we want our sanitary sewers to dictate the development of the County or whether we want a comprehensive land use development plan to prescribe the pattern in which we should grow. Furthermore, the decision must be made today as to what development plan Fairfax County is to follow. Such a plan is needed so that the sanitary sewer systems which are now being planned for the County can be based on a comprehensive land use plan. To date, it has been just the opposite.

*The Background of the Study. Having now discussed some of the major drawbacks of the existing Board policy on the installation of sanitary sewers, it is appropriate to analyze the two alternative policies. To present them in comparison with the prevailing policy, the Difficult Run watershed is used as a study area. The obvious savings of constructing and maintaining the alternative systems under suburban cluster planning would, of course, have

to be multiplied to include the potential savings from applying one of these adopted policies on a countywide basis, so as to include all other watersheds not yet sewered.

The main objective of this comparison is to prove that designed sanitary sewers under cluster planning would present a definite savings to the taxpayer. There are definitely other advantages which the alternatives present, and these shall be elaborated upon throughout the discussion.

In all three designs, it was necessary to hold constant certain factors in order to derive a fair cost comparison:

(1) The maximum designed capacity of the Difficult trunk leading into the Potomac Interceptor was held constant. This capacity expressed in population is 109,708, which is the projected sewer contribution for this watershed for the year 2000, and the maximum anticipated contribution upon which the Potomac Interceptor was designed. All three alternatives, then, will accommodate this same given capacity, thus keeping the per capita share of the cost constant.

(2) The proposed 54" trunk coming from the Interceptor up the Difficult stream to Route 7 and heading west to the proposed Reston system was held constant, as was the entire Reston sanitary sewer system. These lines are already planned, and it would be difficult to suggest any alterations under a given design, so the cost for installing these lines was held constant. By so doing, the obvious greater difference in cost between the three systems was decreased. A comparative study in other watersheds, not yet having any sewer trunks, would undoubtedly result in a greater comparative savings by employing one of the suggested alternative policies.

It must be clearly understood that this study is not intended to present a true cost analysis of sewering the Difficult Run watershed. The main objective is to ascertain the comparative cost between these different systems. Therefore, the figures presented do not represent the real cost of sewering this area but they do present a fairly accurate comparison of cost between the three alternatives. This is possible because the following additional factors were equally applied to all three designs:

(1) The determination for the size of a sewer trunk is based on two things: (a) the expected contribution (under today's policy, a flat contribution from 10 persons per acre is applied), and (b) the slope of the land. Because of the element of time, it was impossible for the Planning Staff to determine the sizes of the trunks, based on the varying slopes throughout the watershed. Therefore, a constant 1% slope was used in determining the trunk size, from which it was calculated the number of persons that could be served by the varying sizes of pipe. These trunk sizes and their respective contributions, then, were applied to all three systems, making the desired comparison valid, but not presenting the possible real cost.

(2) The total cost of each of the three systems was based on the same average cost figures of installing and maintaining the varying sized lines. These average cost figures are presented in the following chart:

AVERAGE COST PER LINEAR FOOT OF PIPE

Complete installation, easement, and 20-year maintenance

Pipe size	Cost/linear foot	Pipe size	Cost/linear foot
10"	$11.07	27"	$21.22
12"	14.02	30"	24.22
15"	15.07	36"	28.72
18"	16.12	42"	33.22
21"	18.12	48"	37.72
24"	19.57	60"	46.47

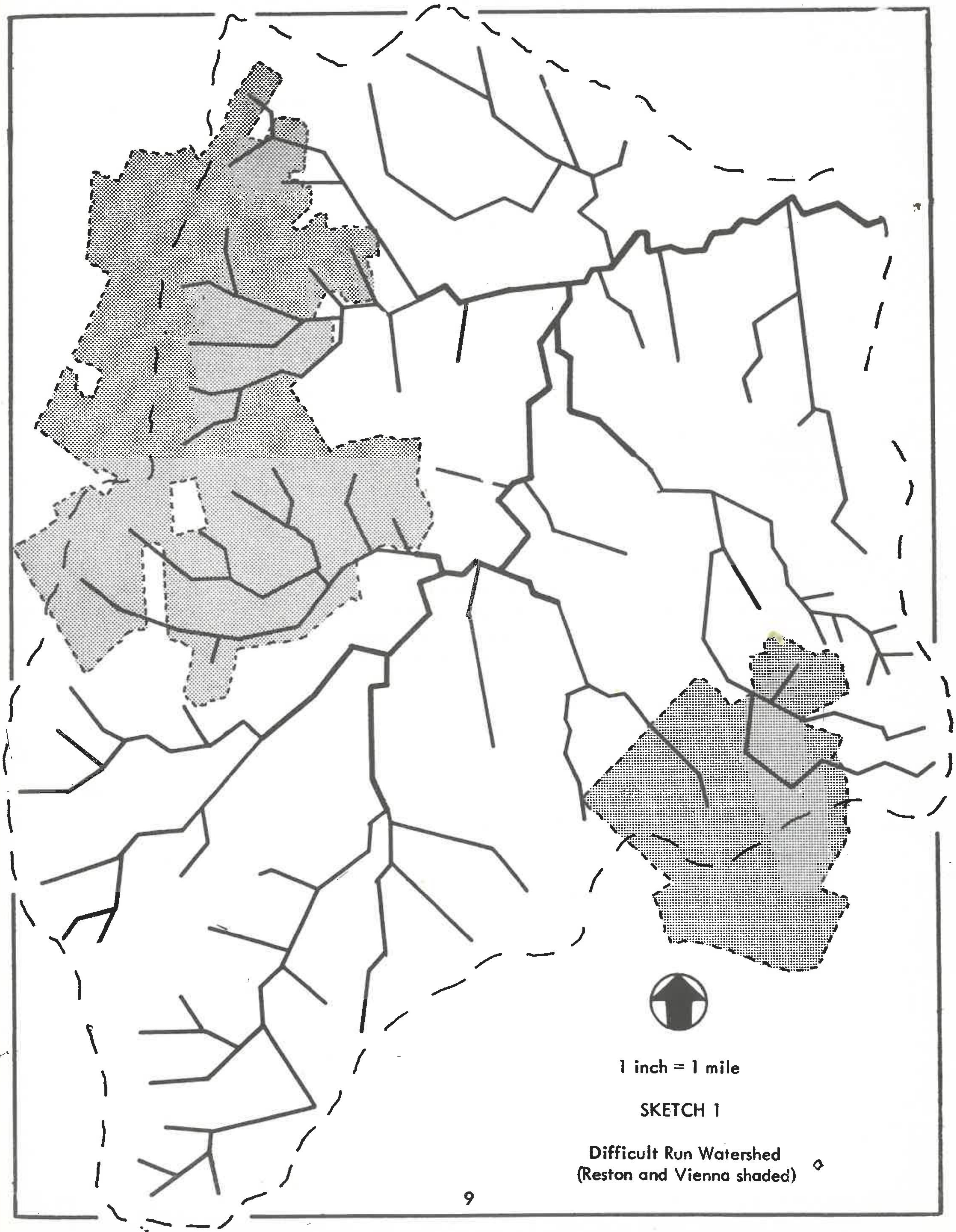
*Design 1 - Present Board Policy (resulting in sprawl). Sketch 1 illustrates the design of a sanitary sewer system for the Difficult Run watershed reflecting the prevailing policy of today - that of designing the system to accommodate an average of ten persons per acre. Such a system installed in this watershed could theoretically accommodate from 300,000 to 380,000 persons, but the trunk up the Difficult stream is designed to accommodate only 110,000, and more important yet, the Interceptor itself is designed to handle only this contribution from the Difficult watershed. It must be clearly understood that the Potomac Interceptor was planned and designed to accommodate a given projected population from Fairfax County. The breakdown of the County contribution is as follows:

Horse Pen Run	30,781
Sugarland Run, including Herndon	61,006
Difficult Run, including part of Vienna	109,708
Scotts Run, including Tyson's Corner	45,000 approx.
	246,495

These contribution figures are pointed out to stress the fact that care must be exercised in these watersheds of the County on all land use planning and rezoning. To do otherwise, and in the long run possibly overload the Interceptor, could prove to be very costly. This 110,000 persons is the projected contribution that could be expected by the year 2000; thus, in terms of per capita cost of installing one system in comparison with any alternative system, it is only logical to use this contribution figure throughout the analysis.

The estimated total cost of installing and maintaining this system in the Difficult Run watershed is $7,500,000, of which $2,200,000 represents the cost of the Reston system and the 54" trunk from the Interceptor to Reston, both of which were held constant through all three designs. The per capita cost of this system would be approximately $68.00.

The primary objection to the installation of a sewer system designed under this existing policy, other than its comparative high cost, is that it induces sprawl development. Large areas in



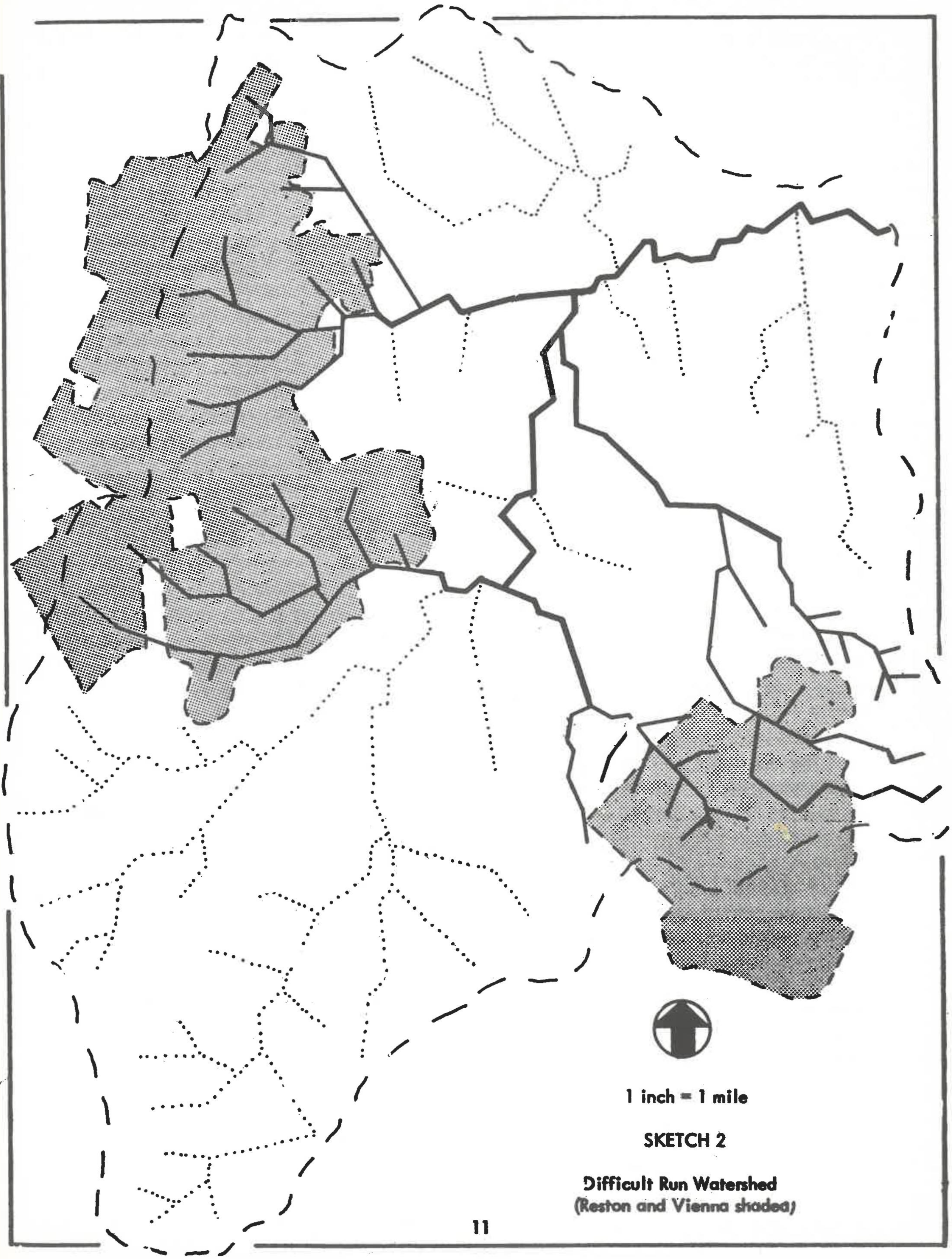
SKETCH 1

Difficult Run Watershed
(Reston and Vienna shaded)

the Difficult Run watershed, as in other watersheds in the western County, have been set up for low-density development. There has been an expressed desire by many to retain much of this land in low density. To install sewers designed to accommodate R-12.5 density in areas desired for one-acre and larger lot development does indeed present a paradox, the point being that you must plan for low-density development if you want it, and the first step in such a plan would be to not design the sewer system for a higher density. A system designed under the present Board policy makes it most difficult to effectuate a desired land use plan having some proposed low densities. For this reason, alternative policies are suggested.

*Design 2 - Controlled Access System. One such alternative would be a controlled access system illustrated in Sketch 2 as it might possibly appear in the Difficult Run watershed. The design of this system, and in turn, the size of the trunks, would be based on a given adopted suburban cluster land-use plan. Such a system would have trunks sized to accommodate only that contribution expected from the uses adopted on the land use plan. More specifically, trunks extended through areas of one-acre and half-acre densities would be designed to handle only the resulting contribution - not a flat ten-persons-per-acre as is the policy today. This would almost guarantee these desired densities in the area, and would somewhat relieve the pressure for rezonings to a higher density. Such a system would provide sewer facilities to all residences; therefore, theoretically the same amount of linear feet of sewer trunks would be provided as under the present policy (Design 1). The size of the trunks, however, would be definitely smaller in the majority of the watershed. The cost of this system would be $6,700,000, including the 54" trunk and the Reston system, or roughly $800,000 less than the cost of the designed system described previously. Based on the 110,000 projected and expected maximum contribution, the per capita cost of this system would be approximately $60.00. In comparison, this does not represent a tremendous saving, and could possibly, on a per capita basis, be more expensive than Design 1; the reason being that it is more costly per capita to run sewer through one-acre development than it would be through R-12.5 development. Likewise, however, it is less costly per capita to sewer RM-2 densities than R-12.5. As mentioned, this system would provide sanitary sewer facilities to the low-density areas - - one-acre to five-acre estates. There is no policy today for providing sanitary sewers to planned low-density areas and the Planning Staff is somewhat hesitant in suggesting such a policy because of the questionable economic feasibility of it. We agree with many that it would be ideal to ultimately plan for sewering every parcel in Fairfax County, but the question is raised, Who is to pay for this ultimate system?"

Is the County capable of assuming the cost of extending trunks into areas established in one, two, and five-acre development where the soil lends itself to good septic fields? We question this. We also question the desirability of depending on the developer or property owner for financing these extensions. Experience has shown that it is not economically feasible for developers to extend sewers into areas of any lesser density than R-17 when good septic tank percolation prevails. Therefore, this optimum plan for sewer facilities seems to be somewhat out of the question as of this day and time.



1 inch = 1 mile

SKETCH 2

Difficult Run Watershed
(Reston and Vienna shaded)

If, however, at some future date the County should adopt a policy of providing sanitary sewers to every parcel, it is recommended that the trunks be sized to accommodate only that contribution from the use of the land as adopted on the master plan. Again, if any low density is desired in Fairfax County, then we must plan for it!

*Design 3 - Limited Access System. A second alternative, a limited access system, is illustrated in Sketch 3 as it might appear in the Difficult Run watershed. The design of this system, and in turn the size of the trunks, would have to be based on a desired suburban cluster land-use plan. No trunks under the initial design would be extended or provided in areas where low density is adopted, provided that good septic tank percolation prevails. Only planned densities of R-17 and higher would be served by this system. This would literally guarantee the desired densities in the appropriate places, and such a policy would offer a much lower cost figure than the two designs already mentioned. To emphasize again, however, a policy would have to be established on the provision of sanitary sewers in planned low-density areas where good septic tank percolation exists before this alternative could be seriously considered. The Planning Staff would recommend that ultimately all areas of the County would have sanitary sewers, even in low-density areas if it were so desired and the capacity were present, but as far as today's practice is concerned, a limited access system would be suggested.

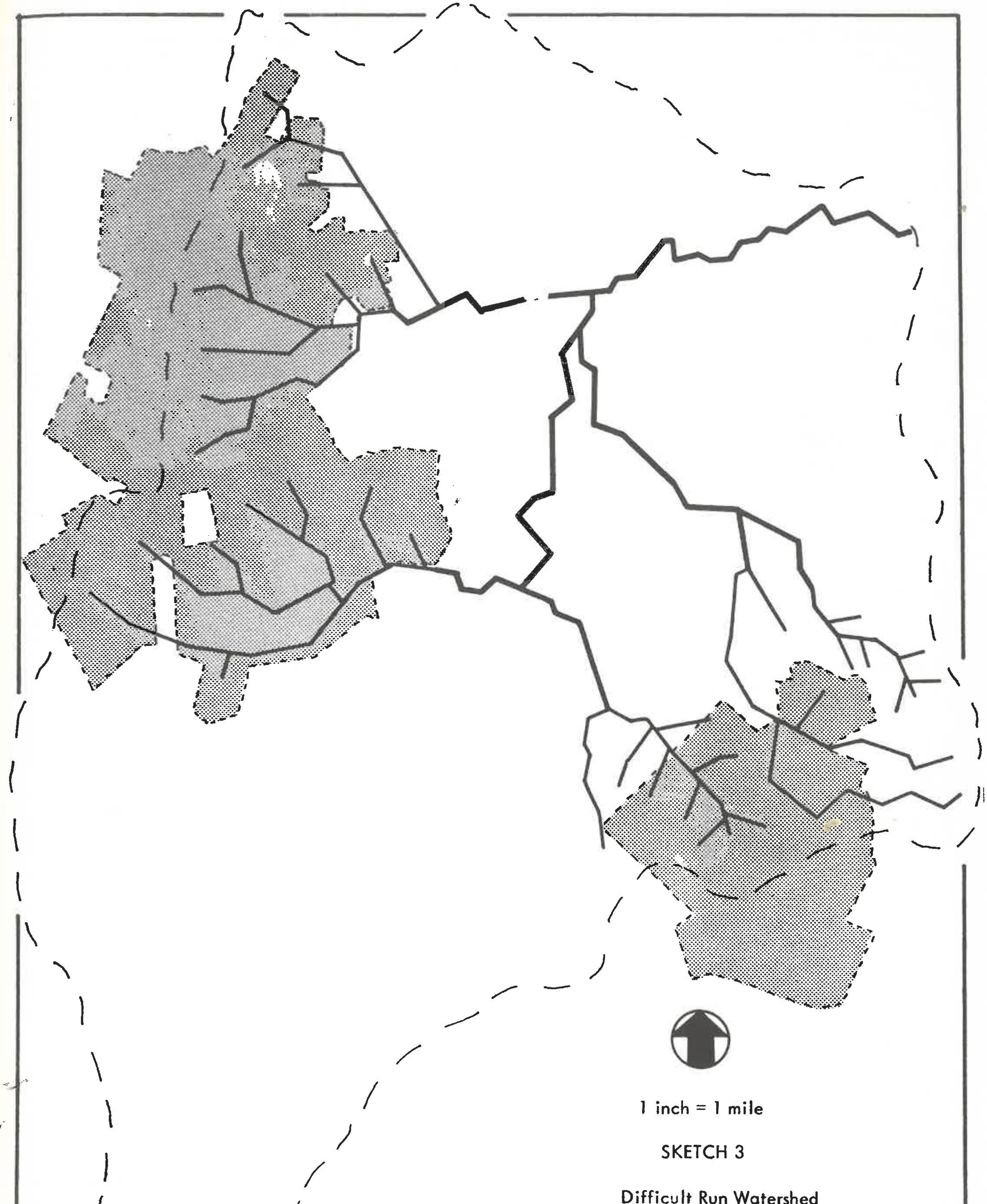
This limited access system, designed to accommodate 110,000 in the Reston community and in and around the Town of Vienna, would cost roughly $3,800,000, or $3,700,000 less than Design 1, present policy. The per capita cost would be only $30.50, or approximately one-half the per capita cost of Design 1. Thus, in the Difficult Run watershed, sewer facilities could be provided at approximately half the cost, and the desired low-density areas could be somewhat relieved from the pressure for higher density uses. Excellent soil conditions in this watershed, well-suited for septic fields, present the good possibility of firmly establishing this area with low-density uses consisting of large estates, one and two-acre subdivisions, and other open space uses. The introduction of sewer facilities in these desired low-density areas of the watershed will be the same as introducing the pressure for higher density uses. From the standpoint of good land use planning, such medium and high-density uses could be better accommodated in the central areas of the Reston and Vienna suburban clusters.

*Summary. In concluding this discussion on the possible savings in cost of providing sanitary sewers to suburban clusters rather than to sprawling development, the following points should be emphasized:

(1) A Board policy must be established on the plans for providing sewers in planned low-density areas.

(2) A comprehensive land use plan must be adopted before the designs of sewer extensions into the western two-thirds of the County are approved, so that sewer planning can be based on land use planning - - a more logical arrangement than the reverse situation.

(3) Due consideration must be given to all of the advantages of the two suggested alternative policies, such as the retention of desired low-density areas, as well as the possible savings in cost.



SKETCH 3

Difficult Run Watershed
(Reston and Vienna shaded)

(4) The comparative cost figures are presented again to emphasize but one point - - there could very well be a savings recognized upon adopting a modified policy on sanitary sewers, based on a Suburban Cluster plan. On a per capita basis, however, it is pointed out that if the projected population for the year 2000 is disregarded, Design 1 (10-persons-per-acre) could possibly be less expensive in the long run. But the desirability of disregarding the projected population, and in turn the projected sewer contribution, is questioned.

	Total Cost	Per Capita Cost*
Design 1	$7,500,000.00	$68.00
Design 2	6,700,000.00	60.00
Design 3	3,800,000.00	30.50

*Based on projected and expected population by year 2000.

The comparative cost figures presented are for only one watershed (Difficult Run), and the difference in cost would have to be greatly enlarged to include the difference incurred from sewering all other watersheds in the western county. Despite these rather apparent possible savings, it must be pointed out that the savings of providing sanitary sewers under suburban cluster planning represent but one small area of possible savings.

Several discussions have been held with various members of the Department of Public Works concerning the portions of this report relevant to their work. They debate certain points, but basically agree with the thoughts presented on sanitary sewers and storm drainage. In addition, a letter from Massey Engineers, consultants for the County, is attached as part of the appendix, revealing their thoughts on the areas of possible saving in the provision of both sanitary sewers and storm drainage.

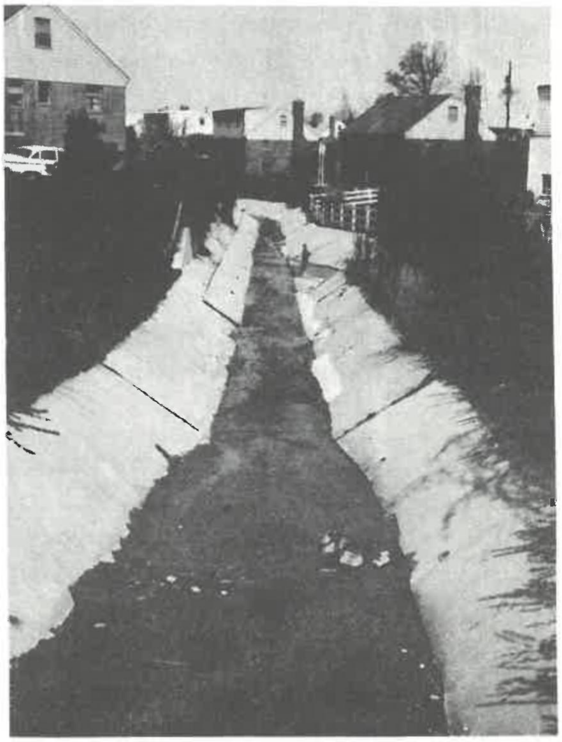
STORM DRAINAGE

The Public Works Department has been and will continue to be plagued by the evergrowing problem of eliminating potential storm drainage damage. Whereas it does have a very active program, attacking the storm drainage problem in many ways, the most crucial aspect of this problem yet to be fully solved is how is this very expensive facility to be paid for? True, the financing of storm drainage improvements is an integral part of the program today, but the procedure used is oriented more to take care of immediate requirements than probable ultimate needs.

The point is that millions upon millions of dollars will have to be spent either by the County or by developers in providing these needed improvements in Fairfax County. Regardless of the arrangements made as to how the improvements will be financed, the citizens of the County will pay for them. They will pay through either increased taxes or higher price tags on the purchase of property. Since storm drainage improvements are a necessity, and since they must be paid for by the citizens in one form or another, it seems that the most logical attack on the problem would be to ascertain the best way to cut down on the total cost of

these facilities. It thus follows that the development of the land, which is the primary factor behind storm drainage problems, should be carefully and seriously considered as the major issue in this program for eliminating storm drainage damage.

Under a policy of development such as the Suburban Cluster Plan, many dollars could possibly be saved in the provision of storm drainage improvements. Due to the limited amount of time and the present limited state of detailed designs of the clusters, it is impossible to present a comparative analysis of the cost under cluster and sprawl development. It can safely be stated, however, that if the Suburban Cluster Policy were adopted and adhered to, storm drainage improvements would, in our opinion, cost less than the cost of these improvements in a pattern of sprawl development, provided that the cost of off-site improvements were assessed to the developers of the higher density portions of the cluster.



Subdivision drainageway.

The reasoning behind this is very simple. Fewer but larger improvements would be required to solve the drainage problems under Suburban Cluster development. Only the medium and high-density portions of the clusters would necessitate extensive improvements from the cluster to the outfall. The drainageways in the major part of the watersheds could be left in their natural state (which would be esthetically pleasing), because the land adjacent to them would be developed in flood plain parks, conservation areas, low-density development, and other similar uses not requiring major storm drainage improvements. Although the facilities in the denser portions of the clusters would have to be larger, it is pointed out that due to the compactness of the high-density areas (rather than the scattering of these uses) much of these improvements could be feasibly placed under ground, thereby presenting more esthetic advantages as well as economic ones.

Under sprawl development, despite the existing program, storm drainage is a problem which will be expensive to overcome. Development allowed to spread itself indiscriminately across the land of the County will necessitate extensive storm drainage improvements in practically all drainageways. The familiar drainage problems and their costly solutions which exist today in the developed portions of the County will only be projected and magnified in the western part of the County developed tomorrow. If the land is to be filled by sprawling development, we must expect to see all drainageways filled with costly drainage facilities.

To briefly substantiate the statement that much could be saved in providing storm drainage improvements to suburban cluster development, the following facts are pointed out for the reader to ponder:

(1) It costs $15 to $16 per linear foot of street to provide storm sewers, curbs, and gutters. Main and tributary channel improvements are particularly expensive, as for example, in Sanitary District 1, $2.7 million of the initial $8.2 million was to be allocated to main channel and main tributary improvements*.

(2) An initial $8.2 million is needed to solve storm drainage problems in Sanitary District 1 - an area of approximately 16.5 square miles (approximately $500,000 per square mile). This is presented to give the reader a general idea of the tremendous cost of drainage improvements. This cost is undoubtedly higher on a square mileage basis than it would be in other watersheds due to the fact that these improvements were not installed at the time the area was developing (this area was developed prior to the establishment of the existing program); but nevertheless, millions of dollars will be required in areas of similar size which will develop in the future.

(3) Under sprawl development, roughly 250 square miles would need major drainage improvements; under suburban cluster development, about 150 square miles would need extensive improvements. This certainly suggests a possible saving to the County for storm drainage facilities, if off-site improvement costs are borne by the developers of the denser portions of each cluster.

In conclusion, if the Suburban Cluster Plan were adopted and adhered to, the County could realize the savings of dollars otherwise spent on more extensive storm drainage improvements, and they could enjoy the esthetic advantages of stream beds left in their natural state, plus unsightly drainage facilities underground and out of sight in the compact higher density areas. The overall cost may not prove to be greatly less under one plan or the other. The point is, simply, that a new approach to future planning should prove no more costly than the one in use today.

ROADS

If Fairfax County were to adopt and adhere to the Suburban Cluster Plan, further millions of dollars could be saved in the construction and maintenance of both primary and secondary roads and costly interchanges. The construction and maintenance of roads is not a County responsibility, but Fairfax County does pay for this facility through state taxes. While these savings are indirect, they are savings, nonetheless. If Fairfax County takes over the construction and maintenance of its roads, then the savings would be direct.

The conclusion that millions of dollars could be saved in the provision of roads under Suburban Cluster development rather than sprawl development is easily drawn. Far fewer miles of primary and the higher class secondary roads and fewer interchanges would be required to accommodate the population and resulting traffic. In sprawl development, where the population, and in turn the traffic, is spread over a given area rather than clustered, many more miles of primary and higher class secondary roads are required to move the traffic in

* Federation Bulletin, March 1963

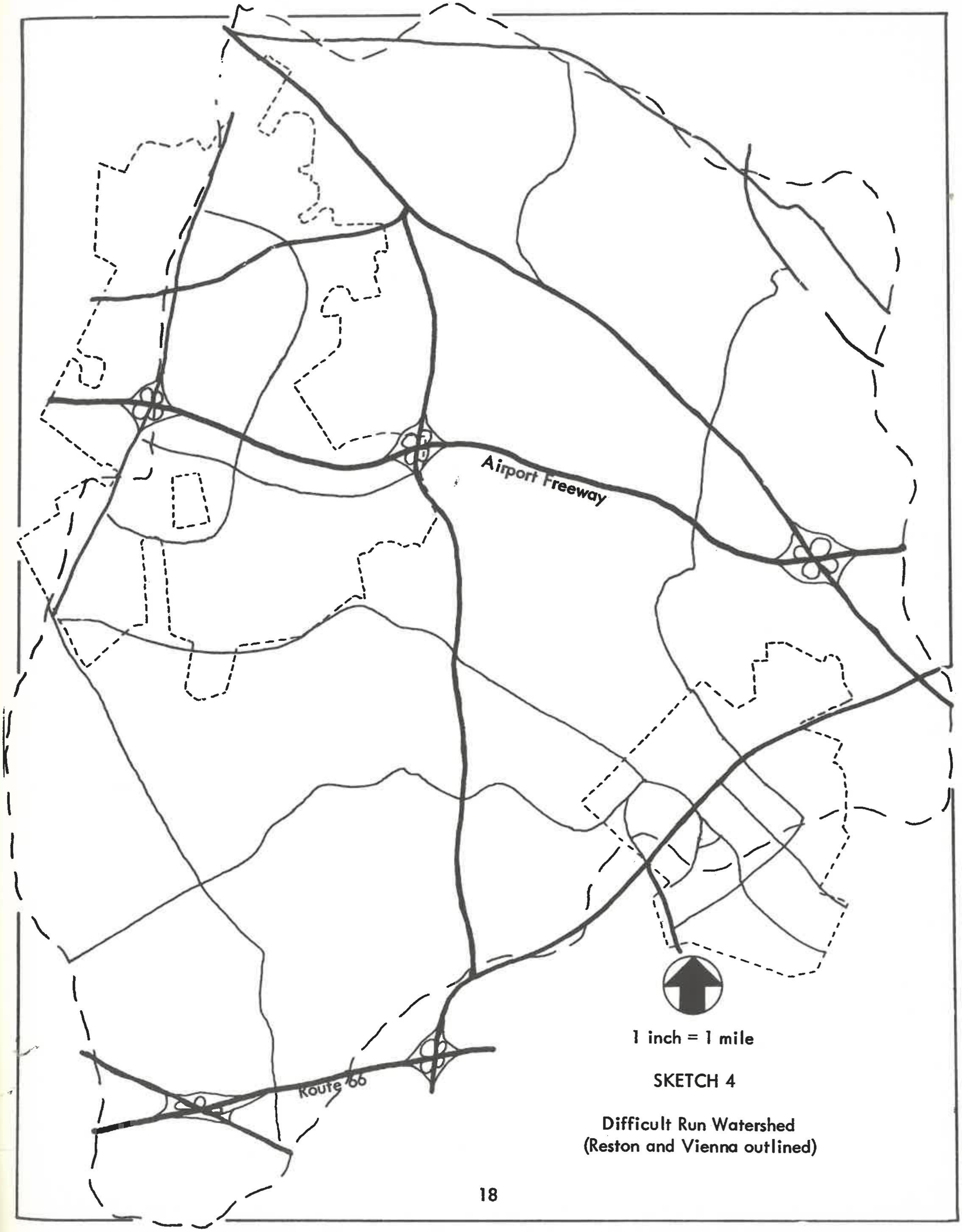
and around the area and to the freeways and highways which will take the traffic out of the given area. To further emphasize this conclusion, it must be reiterated that the proposed suburban clusters are located on or in close proximity to freeways and possible mass transit lines, thus the suggested location of the clusters close to these main arterials would cut down on the number of miles of necessary major roads.

Backlick Road is being widened, at long last, to four lanes.

To illustrate this conclusion, two major road networks were designed for the Difficult Run watershed. Sketch 4 illustrates a major road system that would be required if the watershed were developed under a policy of sprawl. Sketch 5 illustrates a major road system which would accommodate the traffic under suburban cluster development. Using the average cost per mile of $175,000 for constructing primary roads, and $120,000 as the average cost per mile for constructing secondary roads, a cost comparison was made for these two networks*. The system needed under sprawl development would cost approximately $12,500,000; the system needed under suburban cluster development, costing roughly $8,900,000, would yield a 29% saving of approximately $3.6 million.

The maintenance of the road system illustrated for suburban cluster development (Sketch 5) would cost $300,000 less over a ten-year period than the system illustrated for sprawl development (Sketch 4). The comparison of cost on maintaining these two systems was based on the yearly average of $20,000 per mile for primary roads and $7,470 per mile for secondary roads*. The Dulles Airport Access Road and Route 66 were not included in either the construction or maintenance cost computations.

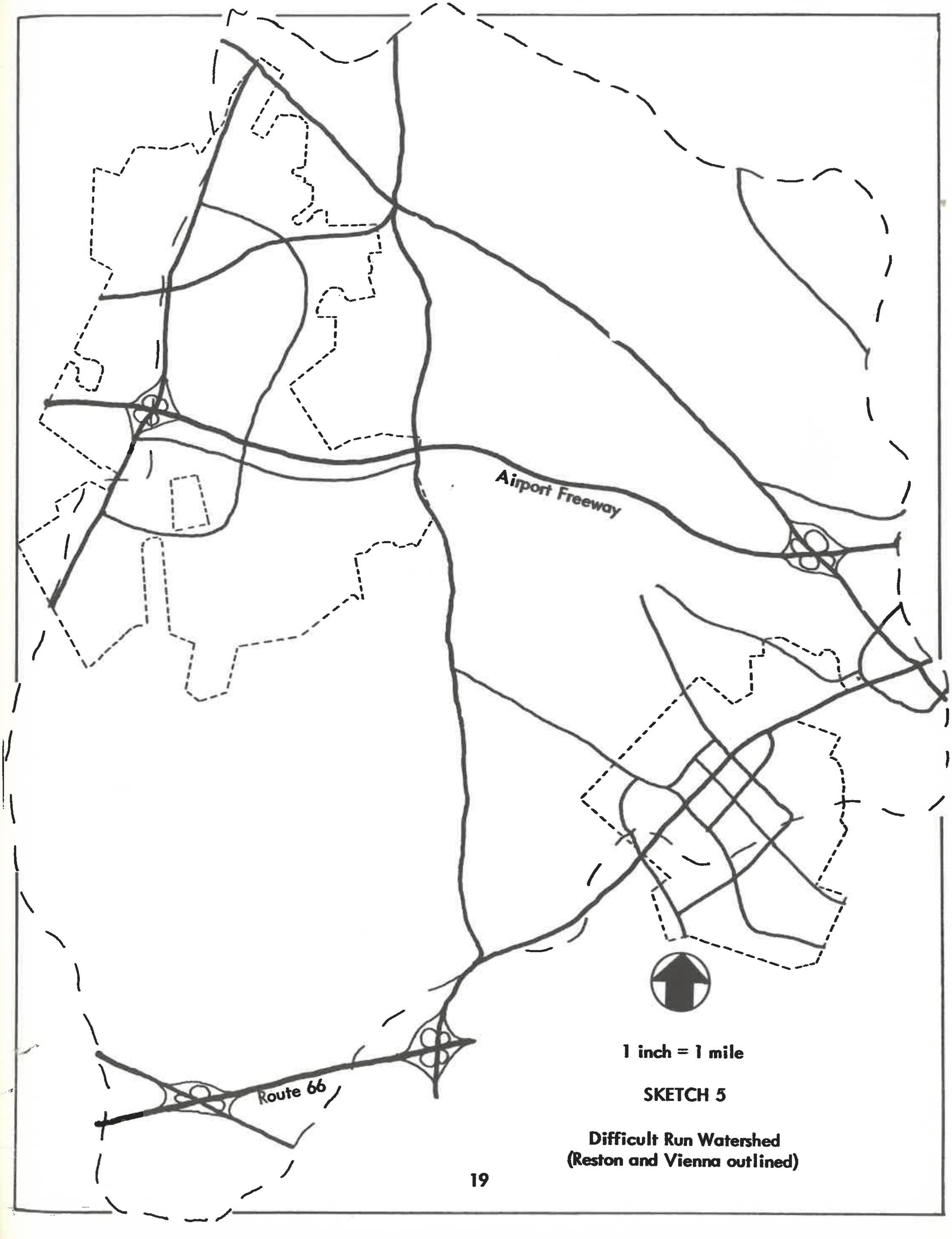
*All average cost figures were obtained from the Virginia State Highway Department, with the exception of the average cost per mile of constructing secondary roads - $17,050 is the overall State average for constructing these secondaries, but such average is way low for urbanized Fairfax County. For example, the purchase of right-of-way and improvement of Backlick Road to a high-class secondary standard is averaging $227,200 per mile. Thus, a median was drawn between these two extremes, and an average cost per mile of $120,000 was used for secondary roads. These construction cost averages include the cost adding to existing right-of-way and pavement to improve roads to meet the standards and also the cost of purchasing the entire right-of-way and constructing the whole new needed facility.



1 inch = 1 mile

SKETCH 4

Difficult Run Watershed
(Reston and Vienna outlined)



1 inch = 1 mile

SKETCH 5

Difficult Run Watershed
(Reston and Vienna outlined)

This cost comparison in the Difficult Run watershed clearly points out that the Suburban Cluster Plan if adopted and adhered to could save Fairfax County millions of dollars otherwise spent on numerous miles of major roads. This becomes more obvious when it is remembered that these savings must be greatly multiplied to include the potential savings on a countywide scale. These savings would make it most feasible to think in terms of providing pedestrian overpasses or underpasses across major roads; more grade separations at major road intersections; and other desirable improvements of critical intersections.

Along with these savings through lower taxes, the residents of the County could enjoy the personal savings from gasoline, tires, general upkeep and maintenance of their automobiles, and the element of time - all of which could be realized under suburban cluster development. Furthermore, the coice would be available for further savings in travel expenses by making it feasible to have mass transportation facilities - in the form of both bus and rail mass transit. This choice may not be available under sprawl development.

PARKS

The acquisition of parkland in Fairfax County is becoming more of a problem every year. The Park Authority often finds that very large sums of money must be paid for needed and demanded parks because it must compete with the sums paid by potential developers. Furthermore, the problem exists as to where it should concentrate its efforts and its limited funds. It is most difficult for the Park Authority to purchase the desired amount of parkland in all of the numerous areas of the County that are developing so rapidly. It simply cannot keep pace in its park acquisition with our rapidly growing population. The Park Authority finds it very difficult to consider the purchase of parkland in the western part of the County (other than some regional parkland) before the development begins and the price of land goes up, because it is forced to use its limited funds for parkland in the already developed eastern third of the County - where parks are demanded today!

These problems exist today, and they will be of a far greater magnitude tomorrow as the County continues to grow and the price of land continues to rise. It is suggested that by adopting the Suburban Cluster Plan, many of these problems could receive a partial solution. Under sprawl development, all land, even a lot of flood plain, has a high price tag on it, for all land having sewer is potentially developable at an R-17 density or higher. Under suburban cluster development, this is not the case. The greatest amount of parkland indicated on the adopted 1958 Park Plan lies within areas recommended for low-density uses; thus, one-acre prices would be paid for parkland rather than R-17 and R-12.5 prices. The parkland needed within the more dense areas of the clusters could, if desired, be purchased at the same or a little higher price than is being paid today for community and neighborhood parks in the more heavily developed areas of the County. But, within the high-density portion of these clusters, it is contended that there is a good chance that the needed parks will be designated into the development by the developer, such as at Reston, and in other areas lands will be dedicated to the Park Authority. Furthermore, with an adopted Suburban Cluster Plan, it will be possible to know where the heavy concentrations of people will be, and thus concentrate on park acquisitions within these areas prior to development and the following increased cost of the land.

Under a Suburban Cluster Plan, larger regional and larger, more usable flood plain parks could be purchased, because of the lower price tag on the land; and larger community and neighborhood parks could be established within the centers of these clusters, allowing for a more efficient park and recreation program. Within the center of these clusters, a greater number of people will be closer to the parks and playground facilities. By making more compact areas of apartments and compact areas of single-family residential homes, it naturally follows that the acquisition, operation, and maintenance of parks can be handled more efficiently. Most of these points are agreed upon and stated by the Director of Parks for the County in a letter attached as part of the appendix of this report.

This section of Pimmit Run has been set aside for Park.

To illustrate the point that a savings could be realized or a greater amount of parkland could be purchased with a given sum of money under suburban cluster development, the results of a study are presented. The cost of acquiring all types of parks (large, flood plain, community, and neighborhood) in all areas of the County was obtained from the Park Authority. From this, the average cost per acre was established for those parks purchased in the developed areas of the eastern third of the County and also for the low-density areas of the western part of the County. It was found that the average cost per acre for the same type park was approximately five to six times greater in the eastern third of the County. Using the established figures, it was found that for a given $5 million, under cluster development approximately 3,000 more acres of parkland could be acquired than under sprawl development.

Parkland is a facility that will always be in demand - more so tomorrow than today, once the vacant acres in Fairfax County become developed. There are 27,000 acres on the adopted Park Plan. To date, the Park Authority has control of only approximately 1,500 acres. Much of this land has been donated or dedicated, and some is simply leased or administered by the Park Authority, but nonetheless, over $1.6 million have been spent on the acquisition of parkland. The problem is apparent, and the best solution is hard to find. But it is suggested that the Suburban Cluster Plan could offer some possible solutions.

SCHOOLS

New additions to the huge County fleet.

As Fairfax County's population increases by 18,000 a year, roughly 6,000 additional school students must be accommodated. This increased enrollment necessitates the construction of 5 1/2 elementary schools, one intermediate, and one high school, and the purchase of approximately 35 additional school buses every year. These 6,000 additional school children will continue to arrive in Fairfax County whether we choose to develop in a sprawl or a suburban cluster pattern, but it will be possible to accommodate these same students at a much lower cost to the County under suburban cluster development. This lower cost or savings could be realized from two areas:

(1) Larger schools could be built to accommodate more students, thus decreasing the total number of schools needed; and

(2) More children could walk to school, thereby reducing the need of bussing them, which is and will continue to be a most expensive operation.

The fact that larger but fewer schools could be built, thus presenting a savings is an alternative which is feasible or would be desirable only under cluster development. In sprawl development, the population and, in turn, the school children needed to make up the enrollment of a particular school are scattered throughout a relatively large area. Therefore, under sprawl development, the only way that it would be feasible to construct larger schools would be to have larger school districts. This would only necessitate a greater need for bussing more children to school. Under suburban cluster development, however, in the compact, denser parts of the cluster, more children would be located within a given school district, thus making it feasible to think in terms of larger schools. The Planning Staff would not recommend larger schools if it was felt that the quality of the education would be sacrificed, but it was learned from other jurisdictions having denser populations and having larger schools that the quality is not harmed as long as the desired student-teacher ratio is maintained. As far as quality is concerned, the thought

is presented that in the future, if and when it is desired to have language laboratories, mechanical shops, and other special classrooms in all three levels of school, it will be more feasible to offer such desired facilities in larger schools (especially elementary).

The second area of savings - - that of reducing the need for bussing the children - - is another savings under the Suburban Cluster Plan that could be realized year after year in the operating cost of the school program. Today, Fairfax County has a little over 73,000 students, and roughly 68% of these students must be bussed to school. This high percentage is a result of the population being dispersed over a relatively large area. At present, it takes a fleet of 330 + buses to accomplish this task, which gives the County the claim to having the largest school-bus fleet of all counties east of the Mississippi River. If the County chooses to follow a sprawl development pattern, by the year 1980, we could expect a fleet of 790 + buses. Under the Suburban Cluster Plan, only 50% of the children would have to be bussed because the majority of the school children would be within the denser parts of the cluster, within walking distance of the schools. For this reason, only 580 buses would be needed by 1980. Whereas this may appear to be a relatively small saving, the following facts will point to the contrary:

(1) It costs approximately $3,960 a day to operate and maintain the 330 + school-bus fleet of today (40 miles per bus, @ 30¢ a mile). By 1980, under sprawl development, it would cost $9,480; under suburban cluster development, it would cost only $6,960 a day.

(2) At present, roughly 30-35 buses are added to the fleet each year at a cost of $5,000 per bus. Under the Suburban Cluster Plan, twelve fewer buses would be needed each year, representing a yearly saving of $60,000, or a saving of $1.05 million by the year 1980. (Note: The fact that the average price of the school bus increases yearly is not included in this projection.)

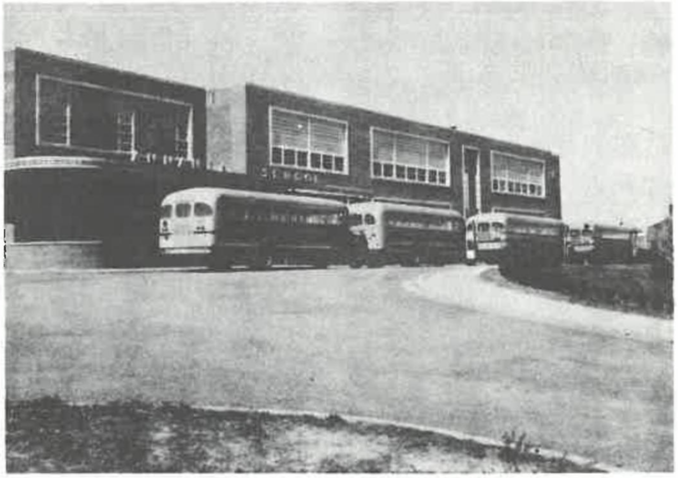
(3) A yearly savings of $26,000 could be recognized under the Suburban Cluster Plan on the operation and maintenance of the fleet of school buses, and by 1980, the accumulative saving would be $420,000.

(4) Thus, under the Suburban Cluster Plan, a total of $86,000 could be saved yearly on the purchase, operation, and maintenance of the bus fleet, and by the year 1980, an accumulative total of $1.47 million would be saved.

A point that must be emphasized is that the type of development (sprawl or suburban cluster) that is adopted today will determine whether these yearly savings can be recognized year after year after year - - the point being that the bussing of school children is a continuous operation and, therefore, under the Suburban Cluster Plan could present a continuous saving.

The pattern of development adopted today will be the same pattern tomorrow (years 2000+), and it is the pattern of development that will determine the location and size of the schools and the number of school buses needed.

A statement from the Associate Superintendent of Schools in Fairfax County, Mr. George Pope, is attached as part of the appendix of this report. From a very preliminary analysis of suburban cluster development and its relationship to the operation of the school system, Mr. Pope concludes that the cost of school sites in the denser portions of the cluster might well be higher than the price paid today. The Planning Staff would have to agree with this to a limited extent; they may or they may not be when you consider the following:



These buses could be a permanent fixture in rapidly developing Annandale.

(1) No zones or uses of higher density than exist today are a part of the Suburban Cluster Plan; therefore, the price of land for a school site should not be any higher than the price paid for land today in areas already largely developed or such areas where the vacant land is claimed to have a high potential.

(2) The school sites in Reston were not expensive to the County, and similar arrangements or dedications could be obtained in other areas of the County where medium and high-density development is adopted, where the given area is in an RPC zone or not.

(3) With an adopted Suburban Cluster Plan, and knowing where the high and medium-density areas will be located, it will be possible for the School Board to concentrate its initial efforts in these areas to obtain future needed school sites. Under sprawl development, the purchase of future school sites will be based more on projected guesses of where the given population will be, and more than likely the sites will be purchased as the given area is developing, when such land will already have a high price tag on it.

(4) The addition of the R.C.N. zoning amendment will provide an opening to reserve certain areas for future school sites. Since, however, the land is to be permanently open under a density-designed subdivision, acquisition of a site in one of these areas may be delayed to the last minute by the School Board. Even with this disadvantage, there will be available more sites from which to choose, than could be available under a sprawl plan.

Thus, these possibilities do suggest that it is not conclusive that certain school sites within suburban cluster development will be more expensive. If, per chance, the sites may be more expensive, it is contended that such higher cost will be easily offset by the savings accrued from the construction of larger but fewer schools and the continued savings from the operation of the huge school bus fleet.

LIBRARIES

This inadequate facility will have to be rebuilt on a new site.

A letter, attached as a part of the appendix from the Director of Libraries in Fairfax County, Mrs. Mary McCulloch, clearly points out that the Suburban Cluster Plan offers many advantages to the operation of the Library system. The primary advantage is very simple - under suburban cluster development, the County public libraries could offer a far superior service and at a lower cost than could be offered under sprawl development.

If the County were to adopt a sprawl plan, to provide adequate library facilities for the projected 900,000-1,000,000 persons by the year 2000, it would necessitate four new regional libraries or reference centers and 16 new branch libraries over and above the libraries existing and planned today. This would cost the County approximately $6.75 million. If a cluster plan were adopted, seven additional regional libraries to those existing and planned today would be required to accommodate the same 900,000-1,000,000 persons. This system would cost the County only $5 million, which represents a saving of $1.75 million.

As Mrs. McCulloch points out, the population of today and that of tommorrow will demand a very high quality of library services. This demand will best be met by thinking more in terms of regional reference centers than smaller branch libraries. It will not be as feasible to offer this desired quality of service to the population under sprawl development, because smaller branch libraries will be a necessity to bring the library facilities close to the greatest number of people, and this demanded quality of service cannot be provided in small branch libraries. Under suburban cluster development, regional reference centers are most feasible, and will provide a higher quality and more efficiently administered library system, at a lower cost by approximately $1.75 million.

POLICE

It would be most difficult to conduct a cost comparison analysis on police protection under sprawl and suburban cluster development. If the Suburban Cluster Plan were adopted, there would definitely be areas of saving in the provision of this service, but on the other hand, there might possibly be areas representing an increase in cost. For this reason, a brief statement is in order, explaining the possible effects of the Cluster Plan on the administration of police protection.

The areas of possible saving under the Cluster Plan are twofold:

(1) Ultimately, fewer patrol vehicles would be required to provide the needed protection. Therefore, a savings could be realized in the capital output for new vehicles and the operation and maintenance cost of such vehicles. This would be possible because fewer square miles of highly developed land (medium and high density), requiring more police protection, are found on the Suburban Cluster Plan. In other words, the police districts within the center of a given cluster would be smaller (fewer square miles) because the population would be more gathered, and in the low-density areas surrounding the heart of the cluster, fewer patrol cars would be required to police the area than would be necessary under sprawl.

(2) Large open, semi-rural areas such as the existing areas around Herndon and Clifton require far less policing than do such developed areas as around Springfield and Bailey's Crossroads-Seven Corners. Such open areas are a dominant part of the Suburban Cluster Plan, but would be practically nonexistent under sprawl development. The result of less-needed police protection in such areas would represent a saving to the County.

This brings us to the discussion of that area where a possible increase in cost may offset the areas of saving. Today, the Fairfax County Police Department has a force of 208 patrolmen, which on a per capita basis is 3/4 patrolmen per 1,000 residents. It would be desirable to have a ratio of 1 patrolman/1,000 residents. The ratio recommended for cities is 2/1,000, and some cities have as high as 3/1,000. The point is that where people live close to one another as in small-lot subdivisions, apartments, etc., more trouble is generated, thus more police protection is required. Major Durrer, Chief of Police of Fairfax County, points out in his statement, included in the appendix of this report, that within the central portion of the clusters, a higher ratio of patrolmen might be needed per 1,000 residents.

To debate this point somewhat in its relation to the Suburban Cluster Plan, the following two thoughts are presented:

(1) The caliber of persons will play a dominant role in the determination of the needed police force. It is contended that the caliber of persons living in the denser portions of suburban clusters, such as at Reston, will be similar to the existing suburban residents in the County, and a lot higher caliber than many persons living in the older, denser areas of cities across the country. Thus it may not be necessary to think in terms of any higher ratio of patrolmen per residents than that desired today.

(2) To reiterate once again - no higher densities and no higher percentage of persons living in apartments is a part of the recommended Suburban Cluster Plan. The same number of persons will live in apartments and in medium-density areas under sprawl development, relatively close to one another as in the eastern third of the County; therefore, there will only be more smaller, dispersed, congested areas which must be policed, rather than fewer, larger ones under Suburban Cluster Plan development (ref. page 1, par. 2).

From this discussion, the following can be concluded as was stated at the start: Obvious areas of saving in the provision of police protection can be recognized under suburban cluster development, possibly to be offset by other areas of potential higher cost.

NATURAL RESOURCES

There is no doubt that the adoption of the Suburban Cluster Plan would be synonymous with the adoption of a Plan for the Preservation of Natural Resources. The endorsement of sprawl development would be the same endorsement of literally scraping the landscape of its natural covering. The exact monetary cost of natural resources would be difficult to establish because natural resources have many values, some of which could not be assigned a dollar-and-cents figure. The point is, however, that what the bulldozer removes today as it pushes westward across the County is something that cannot be restored tomorrow, and the problems thereby created have most costly solutions.

Everyone is aware that in order to accommodate our rapidly growing population in Fairfax County, development of the land must take place. The problem is presented, however, that in the process of development, land must be cleared, and the natural resources must be removed. Under sprawl development, the clearing of land and, in turn, the removal of natural resources is a rather massive and unorganized operation. Development just seems to spread and soon monopolizes the landscape, leaving but small, insignificant undeveloped pockets here and there, that are bound to be cleared at a future date and filled in.

In suburban cluster development, a more organized and a more reasonable approach is presented to clear and develop the land. Large, dominant areas surrounding the higher and medium-density portions of all the clusters would be left in open space, consisting of low-density development, estates, farms, and parks, in which the natural resources could be left in their natural state. This opportunity to preserve some of the natural resources should not be considered lightly. The importance of this preservation is a matter that will multiply each year as the County population continues to grow.

To illustrate the magnitude of this situation which must have a solution, let us first consider the natural resource of water. A major problem facing the entire eastern seaboard of the United States in the oncoming years is the supply of water. The quality of the water is more at stake than the quantity, for the quantity could always be enlarged by resorting to the purification of saline waters. But the quality of water would be definitely sacrificed, and the tremendous cost involved would seem to be most unnecessary since we have the opportunity <u>today</u> to plan on preserving and protecting the existing supply. Both the Occoquan

and the Potomac Rivers, which are the primary sources of water for residents of the County, have enough flow and will continue to have enough to serve the expected population, but only if the development on a watershed basis is carefully controlled. Siltation, which is a direct result of clearing away natural vegetation and trees and developing the land with impervious structures as homes, apartments, stores, and parking areas is the biggest problem which must be overcome. Siltation could pollute and damage the streams and in turn the surface water supply to such an extent that these existing supplies of water would be inadequate to meet the growing demand. Since 1951, the Board of Supervisors has never violated the recommended policy of protecting the Potomac watershed above the water supply intake. It is suggested that this policy be continued, and that added strength be given to it by endorsing the Suburban Cluster Plan. Such an endorsement would provide the best protection to all the tributaries within the County which feed into the Potomac and Occoquan Rivers, and thus make up the water supply.

Will this fishing spot be preserved for future enjoyment?

The preservation of trees and natural foilage is a second important resource needing serious consideration. Besides their scenic beauty and esthetic value, trees are soil holders. By this it is meant that trees play a most important role in preventing erosion and siltation - they tend to hold the topsoil in place. There is little need to reiterate the storm drainage problems which the County is facing today and will continue to face in the future, but it is important to point out that by the preservation of as many trees as possible, this problem will be partially solved. Furthermore, the retention of trees will help guarantee that a good surface water supply will be available in the future. Trees can be replaced, and should be whenever possible, but it takes considerable time for trees to grow, during the lapse of which many problems can accrue. For example, it takes 20-40 years for the average tree to gain medium growth. It takes 60-100 years for deciduous trees to gain full growth. This time factor certainly does suggest that care should be taken to preserve as many trees as possible, and the Suburban Cluster Plan offers this opportunity.

Topsoil and the environs for wildlife are two other natural resources deserving consideration. Under sprawl development, topsoil is bulldozed away with the trees, and what little does remain is likely to wash away within a short period of time. Wildlife and even domesticated animals such as a fine herd of beef cattle are allowed no room in sprawl. Room is available for them in suburban cluster development, however. Stream valleys left in their natural state, scenic hills, woods, and other esthetically pleasing sights which many people enjoy and are a part of Fairfax County today, could be a part of the County of tomorrow - - but only under the Suburban Cluster Plan will they be in their proper setting.

These are some of the natural resources which could be preserved under the Suburban Cluster Plan. Some mentioned do have a definite monetary value attached to them, and, coupled with the esthetic value of all of them, the natural resources of Fairfax County deserve the greatest amount of protection for the existing and future generations to enjoy. Mr. Lawrence Mitchell, Chairman of the Board of the Northern Virginia Soil Conservation District, in his letter attached as a part of the appendix, agrees that the Suburban Cluster Plan does offer a greater potential for preserving these natural resources of the County.

OTHER AREAS OF SAVING WHICH DESERVE CONSIDERATION

The areas of saving presented by the adoption of the Suburban Cluster Plan rather than a sprawl plan are by no means exhausted. But as was pointed out at the beginning of this study, the primary intention of this report is to stimulate thinking along these lines. The savings recognized from the provision of the following services and utilities under suburban cluster development can be briefly discussed, and this is the only reason why they have been grouped under a common heading. The savings from them could be substantial and the efficiency of administering these services and facilities alone would offer all the reason needed to thoroughly justify the Suburban Cluster Plan.

*Fire Protection. Within the denser portions of the cluster, larger fire stations with more and better equipment would be feasible. Fire protection could be brought closer to a greater number of persons than would be possible under sprawl. Hook-and-ladder trucks, for example, needed in the County today for the existing multistory structures, could be more logically concentrated in fire stations in the high-density centers of the clusters, rather than sparsely distributed among the more numerous small, scattered stations needed in sprawl development.

*Water. As has already been discussed under the section on Natural Resources, the Suburban Cluster Plan offers a good solution to the growing problem of protecting the surface water supply. The obtainment of a good source of water which will prove to be of sufficient quantity to meet the continuously growing demand, the storage of this resource, and the filtration of it, are the primary expenses incurred in furnishing water to County residents. These identical expenses will have to be incurred whether the County chooses to follow a sprawl or a suburban cluster development pattern. Therefore, it is contended that given the same number of persons under both development patterns, and in turn the same demand for water, the cost of furnishing this resource should not vary under either plan.

*Gas, Electricity, Telephone. A more efficient distribution of utilities such as gas, electricity, and telephone could be provided under the Suburban Cluster Plan. Based on the same theory applicable to sanitary sewers, a grouping of the medium and higher densities will allow for the grouping of the major facilities needed to distribute these utilities.

*Recreational Programs. A better and broader County recreational program could be offered to more residents under suburban cluster development than could be offered under sprawl development. A larger variety of activities, making use of better facilities, could be more feasibly furnished for the enjoyment of all residents, where such residents are located in more compact settings. Under sprawl development, the scattered population would make it difficult

to justify many of the desired activities and programs.

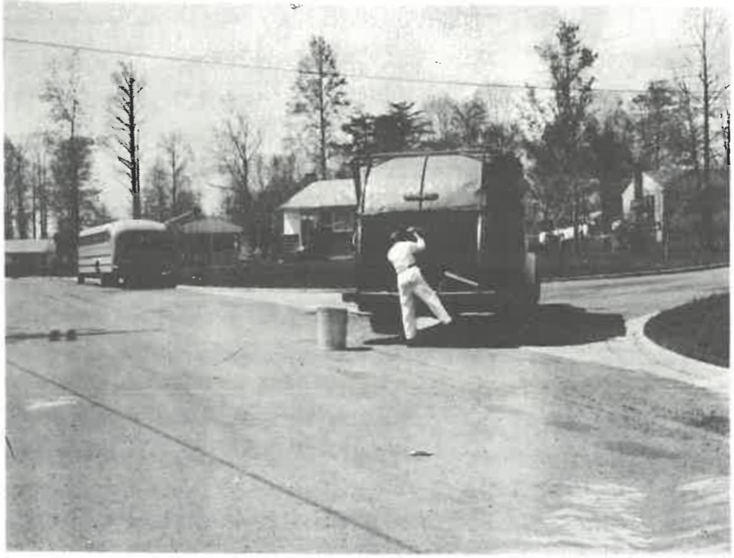
*Hospitals. Larger and better equipped hospitals could be justified under suburban cluster development, bringing this service closer to a greater number of people.

*County Substation Branches. The decentralization of County services could be provided in a more efficient manner under suburban cluster development. Larger branches offering a wider variety of County services could be established within each cluster, bringing these services closer to a greater number of people. Under sprawl development, smaller and more scattered substation branches would be required, offering a more limited variety of services in a less efficient manner.

In sprawl development, recreational facilities often become limited to the point of "Members Only."

*Refuse Service and Disposal. A more efficiently operated refuse collection could be offered to the residents under suburban cluster development. Applying the same analysis as was used for school buses, the County could recognize a substantial savings in the provision of this demanded service, with pickup stations in the rural areas.

*Civil Defense. A more desirable civil defense program could be established under cluster planning. Larger and better equipped facilities could be provided for the protection of a larger number of residents.


Refuse collection and disposal is an expensive service.

*Mass Transportation. As has already been discussed, the Suburban Cluster Plan will make it feasible to provide mass transportation facilities both in the form of buses and rail rapid transit. Under sprawl development, it is difficult to justify an accommodating bus service within the various communities because too great a distance must be traversed to collect the needed passengers. As a result, fewer routes will be established at a greater distance from the sprawling population, with a longer time interval between runs.

As far as a rail rapid transit system is concerned, it will be very difficult to provide the desired service under sprawl development with only two probable lines serving Fairfax County. Many more park-and-ride stations (for which it will be difficult and expensive to acquire the needed land) and major road connections will have to be planned to provide access to the facility. Furthermore, it is very questionable as to whether the rapid transit system will be attractive enough to the potential passengers, the majority of which must drive considerable distances to use the facility. If it cannot be made attractive under sprawl development, then the use of this facility which could help solve the transportation problem in the metropolitan area will have to be discarded as it applies to Fairfax County. Without an accommodating mass transportation system in the County, the residents will have no choice of transportation mode. They will be forced to use their automobiles and, in turn, the highways.

Sprawl cannot support an adequate mass transportation system.

A draft working paper by the National Capital Transportation Agency is included in the appendix of the report. That agency agrees that a "better mass transit service at lower cost and to the transit operator a more efficient system" can be provided under cluster development.

*Commercial Activity. The Suburban Cluster Plan with its concentrated high density and medium density areas lends itself to the planning of larger and more varied commercial centers which can offer a better service to its customers. We could anticipate with greater expectation more centers of a larger size than the typical community or neighborhood shopping center, located in the hearts of the clusters. Thus a greater diversification of commercial activity could be brought closer to the residents of the County.

THE PROBLEMS WHICH MUST BE SOLVED AND THE CONCLUSION

This concludes the discussion of the thoughts and ideas which prompted the Planning Staff to recommend the Suburban Cluster Plan during the fall months of last year. The Staff is still of the opinion today that this pattern of development has a lot to offer to the citizens of today and tomorrow. We urge that the Board of Supervisors, the Planning Commission, every department within the County administration, and all citizens of Fairfax County become familiar with the proposal. As this report and previous reports have suggested, the suburban cluster pattern of development has a lot to offer.

Fairfax County is in need of a revised comprehensive plan. This has been suggested by many concerned citizens. This comprehensive plan is needed today so that a framework can be

established on which to base decisions on community master plans and watershed development plans. We must have this plan in order to properly locate our future schools, park acquisitions, highways, and public facilities. Today, under existing plans, due to our rapidly growing population, it often boils down to a massive guessing game as to where these public facilities and services will be most needed in the immediate future. This undesirable dilemma will be eliminated upon the adoption and adherence to a revised comprehensive long-range plan.

Up to this point, the tone of the discussion of a development policy for the County has been pro-suburban cluster. There are definitely unfavorable aspects of this recommended development policy, for it is by no means a perfect solution. The Staff does suggest, however, that the Suburban Cluster Plan has more to offer to the County than do any of the other alternative policies which have been presented. It can accommodate in the most efficient manner the projected population, providing the proper environment for all types of land uses. Highly desirable estates and farms can be given the most appropriate setting; the continuous demand for medium density, single-family housing can be accommodated in a more orderly manner; the increasing demand for all types of apartments in Fairfax County can be used to help structure the core of the suburban clusters rather than pose a burden on established single-family residential neighborhoods not designed for or desiring adjacent multifamily residential uses.

It is now necessary to discuss the unfavorable or negative aspects of this cluster policy. Definite problems are foreseen, and there should be an awareness of them before committing decisions are made:

(1) To really plan the land use pattern that the Staff is suggesting, open space legislation similar to that proposed in "The Vanishing Land" is required. This is not to say that a suburban cluster policy could not be followed, but rather, that in order for it to evolve as intended, some manner of setting aside and preserving the suburban and rural open areas that are an integral part of the plan, will be required. Until open space legislation is granted, these suburban clusters could be initially structured through the tool of zoning and the design of sanitary sewers.

(2) If a suburban cluster is located right on a major sewer trunk, this will probably mean that the cluster will be split by a flood plain which could mean a design problem and may cause construction difficulties. Such flood plain could well be used to advantage, on the other hand, as flood plain parkland, providing desired open space within the concentrated portion of the cluster. The same idea being incorporated into Reston could be applied to other clusters.

(3) To function properly, the suburban cluster should be located in close proximity to one or two interchanges on a freeway, which could present traffic congestion problems. However, there will be a better opportunity to plan the solution to such congestion problems under cluster planning than under sprawl development. The congestion may be spread out under a sprawl pattern, but there would be more congested intersections to be contended with.

(4) School sites and other public facilities may be more expensive to acquire in the heart of a proposed suburban cluster, as has already been pointed out. But there is a good possibility that fewer sites will be needed (fewer, larger schools) and more sites would be dedicated.

(5) Topography in some areas may tend to limit the potential of development of some clusters. Location of clusters will have to be carefully selected. In other areas, topography could be used as part of the overall cluster layout, to encourage the type, character, and extent of the cluster that is desired by the County.

(6) Planning for suburban clusters and following the plan will take real effort on the part of the Planning Staff, the Planning Commission, and the Board of Supervisors. Very little effort would be required to follow a sprawl plan.

(7) Suburban clusters will probably necessitate the establishment of County governmental substations in each cluster. Such substations will probably evolve under sprawl as well. Under a continuation of the present development pattern, the County will probably ultimately need more smaller substations than under the Cluster Plan, in order to maintain the same level of services.

(8) Shopping facilities will not be as convenient in the low-density and conservation areas as under a sprawl pattern. But, on the other hand, a greater majority of the people will have better access to shopping facilities under the Cluster Plan. There could even be a lot more "walk-to's" within the heart of the cluster, which are virtually nonexistent today.

(9) Fragmentation of land ownership in the center of a proposed suburban cluster may cause problems and make it difficult to evolve with a well-designed center. But past experience has shown that when a community conceives a well-designed plan for its future, and then adheres to that plan, the economics of the situation (namely, the law of supply and demand) will see to it that the problem of fragmentation of ownership will in most cases solve itself. In presenting the Tyson's Corner Master Plan, the Staff felt that fragmentation of ownership was a problem on the Gudelsky tract. The Board was quickly assured by the applicants that this was not so.

(10) The evolution of new clusters must be carefully timed with the required proposed facilities; i.e., highwwys, schools, and sewers. But as we all know, this is the very essence of planning.

(11) Under present Virginia law, these areas could readily be incorporated as separate jurisdictions. This is not a completely valid argument against cluster planning for the following reasons:

(a) Any community having 2,500 people may apply for town or city status today (McLean, Springfield, Annandale, etc.).

(b) Planning for the public benefit should not be sacrificed through dispersal plans because of this fear. It is a well-recognized problem, and strong attempts are being made in Virginia to solve it (city status, urban county plans, annexation commissions, etc.).

This concludes the discussion of the hurdles which must be crossed if the County should choose to adopt the Suburban Cluster Development Policy. Despite the seemingly difficult obstacles which will be presented, the Planning Staff is certain that they can all be overcome, and that the resulting development pattern, the savings accrued in providing services and facilities, and the many amenities which will be a byproduct, will well compensate the effort exerted by all.

APPENDIX

G. HUBARD MASSEY, F.A.S.C.E. GORDON L. JONES, M.A.S.C.E. G. BYRON MASSEY, F.A.S.C.E.

MASSEY ENGINEERS
CONSULTANTS
FAIRFAX, VIRGINIA

PHONES CRESCENT 3-2777 AND 3-2778

120 North Payne Street
Ford Building - Room 204
Fairfax, Virginia
April 23, 1963

Mr. R. H. Payne, Jr.
Principal Planner
Planning Office
Fairfax County, Virginia

Dear Mr. Payne:

Mr. Phillip Yates of your office has requested this firm's comments on storm sewer and sanitary sewer systems that will be necessary for the cluster type of development and any difference in the size, extent, and cost of such systems compared with those that are now being designed and constructed in the County.

It is my understanding that this plan is for a high density development in one or more locations along headwater extremities and that low density development or open spaces will be maintained between the clusters. Furthermore, that this plan will provide for the same population that would result from the present trend of water shed development in which 75% to 90% of the land is utilized.

Onsite storm sewer and sanitary sewer systems under the cluster plan would be less extensive, therefore, they would be less costly to construct and maintain. Funds contributed for offsite or downstream storm drainage improvements and the construction of such improvements could be scheduled in a manner similar to that being currently required by the Department of Public Works.

Trunk and subtrunk sanitary sewers would be larger and would have to be initially constructed for the entire length to serve cluster developments. These conditions would result in a greater first cost which may require a fluctuation in service charges over the design period depending upon the method for financing the works.

It is our opinion that the merits of the cluster plan verses the current trend of development would not be materially influenced by the cost and character of sanitary and storm sewer systems necessary for an orderly development of Fairfax County.

Yours sincerely,

MASSEY ENGINEERS

G. Byron Massey

GBM/lm

FAIRFAX COUNTY PARK AUTHORITY
P. O. BOX 234 - ANNANDALE, VIRGINIA

TELEPHONE: CLEARBROOK 6-8282

April 18, 1963

R. H. Payne, Jr., Principal Planner
County Court House
Fairfax, Virginia

Dear Rosser,

I received your letter of January 16 and will be very happy to give you my personal reaction to the "Suburban Cluster Plan".

This past year I have found it very difficult in acquiring land for the Fairfax County Park Authority to negotiate with land owners because, under the present urban sprawl and uncertainty as to what land will be zoned, the price of land has been forced up. Our bond issue, passed in 1959 for land acquisition, was based on an average price of $500 per acre; at the present time we are probably averaging $3,500 per acre. It is my feeling that if we could adopt a policy developed around the "Suburban Cluster Plan", we would possibly have better control of zoning so that those areas designated for parks could be purchased at a reasonable price.

Secondly, I feel that through the "Suburban Cluster Plan", it could be possible for developers to design their developments in such a manner that the neighborhood and community parks will be taken care of with each new development. It may also be possible that we will receive these lands through dedication and thus release much of our funds for stream valley and large park acquisitions.

Thirdly, if we are to acquire the neighborhood and community parks in this plan, our costs of maintenance and operation should be less than if we continue to acquire parks scattered all over the County.

These are my personal feelings on the subject and do not represent any opinion of the Park Authority.

Yours sincerely,

Joe Brown

Joe Brown,
Director of Parks

eml

OFFICE OF
Fairfax County School Board
400 Jones Street
Fairfax, Virginia
E. C. FUNDERBURK, DIVISION SUPERINTENDENT
W. CLEMENT JACOBS, CLERK

January 29, 1963

Mr. Rosser H. Payne, Jr.
Principal Planner
Planning Office
County of Fairfax
Fairfax, Virginia

Dear Mr. Payne:

With reference to your communication of January 16 in which you invite comments from this office on your proposed "Suburban Cluster Plan", I wish to advise that there is a feeling in this office that we can do very little by way of an objective and constructive comment on this plan. We are not familiar with it, nor do we see all of the potential that undoubtedly is claimed for this type of development.

However, it seems to me that as far as our school operations are concerned, the following observations may be pertinent:

a. The "Suburban Cluster Plan" will probably provide for a very high density development within the cluster. Accordingly, land values will probably be substantially higher than they will be if the sprawl approach were to be used. It is quite probable that the higher cost of school sites might be offset in part by the desirability of building much larger elementary schools than we have been accustomed to building, thereby reducing the number of such installations that would be otherwise required.

b. The economics of the situation will probably force us to build elementary schools having capacities of eight or nine hundred pupils. It is necessary that ways and means be found to see that quality is not sacrificed to bigness in the elementary school program in this situation.

c. If the area between adjacent clusters can be kept relatively rural, the transportation load on our pupil transportation system would be minimized in that larger numbers of the pupils would be within the clusters, presumably within walking distance of the schools.

The above statements are not to be construed in any way as being an attempted evaluation of the "Suburban Cluster Plan" for the development of our County as that plan would affect the operation of the schools. I would want to reserve the right to study further our operation within the framework of the cluster.

Sincerely,

G. H. Pope
Associate Superintendent

GHP:rh

COMMONWEALTH OF VIRGINIA

FAIRFAX COUNTY PUBLIC LIBRARY

222 NORTH PAYNE STREET

FAIRFAX, VIRGINIA

BOARD OF TRUSTEES:
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MRS. V. CRAIG RICHTER
MRS. FRANK WATTERS

DIRECTOR:
MARY K. McCULLOCH

January 28, 1963

Mr. R. H. Payne, Jr.
Principal Planner
County of Fairfax
Fairfax, Virginia

Dear Mr. Payne:

In reply to your letter and inclosure of January 16, regarding the development policy of the County Library and the effect of Suburban Cluster Planning vs Sprawl. The following comments might be of help to you.

A library serving a population of 75,000 to 150,000 people may require a building of 20,000 to 35,000 square feet, which could be termed a "reference center", with an ultimate book collection of 150,000 to 200,000 volumes and a professional staff of from 5 to 10 people, plus possibly 1 to 2 additional branch libraries. This would most certainly provide far better library service to the indicated number of people than to have 6 to 8 branch libraries serving from 5,000 to 35,000 people with a book collection of 15,000 to 35,000 volumes requiring a building of 10,000 to 15,000 square feet and having a minimum of 3 to 4 professional staff, plus all of the maintenance costs involved in smaller installations. This all lends credence to the theory that better library service can be obtained less expensively to a larger number of people in a concentrated area where ease of accessability to a greater number of people is available than small inadequately stocked and staffed installations can provide for a limited population. A reference center may cost $750,000 to $850,000 to build and equip vs a branch of 10,000 square feet costing a bare minimum of $250,000 to build and equip. Multiply this by 8 branches and you have a figure of $2,000,000, against approximately $1,500,000 for a reference center and 2 satellite branches; adding personnel and maintenance costs through the years, it's easy to see which is the less expensive operation.

With today's accelerated educational system plus the opportunities offered in adult education, small book stocks and lack of professional help can greatly hamper the kind of service a population of this type demands.

I hope this has satisfactorily answered the effect that Cluster Planning vs Sprawl might have in regard to libraries. If you have any further questions or wish additional information, please do not hesitate to call me.

Sincerely,

Mary K. McCulloch

(Mrs.) Mary K. McCulloch
Director

COMMONWEALTH OF VIRGINIA

COUNTY OF FAIRFAX

FAIRFAX, VIRGINIA

POLICE DEPARTMENT
MAJOR WILLIAM L. DURRER
CHIEF OF POLICE
CR 3-1300

January 18, 1963

Mr. R. H. Payne, Jr
Principal Planner
Planning Office
Fairfax County, Virginia

Dear Mr. Payne:

In reply to your letter of January 17, 1963, and in answer to your specific question, the advantages and disadvantages of the "Suburban Cluster Plan", as related to continued development following a similar pattern for the presently developed portions of the County, I can only reply using experience as a guide.

Generally, it is an accepted rule in Police Administration to base the required amount of police protection to be furnished any given area, on a per capita basis, if possible. However, we have found the more closely knit a development or the more densely populated an area, the more problems originate. I feel this is caused by close association of the inhabitants. Naturally, the more problems that arise the greater the amount of police officers required. We also have found, on population comparison, that less police problems arise when the inhabitants are scattered over a greater area. I feel this is brought about by less physical association.

By clustering individuals I believe that less police mobile equipment would be required but more police officers per 1,000 inhabitants.

Assuring you of continued cooperation, I remain

Sincerely yours,

William L. Durrer
Chief of Police

COMMONWEALTH OF VIRGINIA

BOARD OF SUPERVISORS

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Bull Run Ranch, Manassas

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Nokesville

NORTHERN VIRGINIA SOIL CONSERVATION DISTRICT
114 EAST MAIN STREET, FAIRFAX, VIRGINIA

Telephone 273-7033

C. J. FLETCHER
Ashburn

NELSON CRAUN
Chantilly

WILLIAM C. TRENAR
Manassas

January 25, 1963

Mr. R. H. Payne, Jr.
Principal Planner
County of Fairfax
Fairfax, Virginia

Dear Mr. Payne:

I have your letter of the 16th and have read with interest your preliminary report on "Western County Development."

As you have indicated, I represent an agency the interest of which is limited by competence and declaration to those phases of planning for land use which are concerned with or may affect the conservation and use of natural resources. That, however, is a rather large field, and our Board of Supervisors is committed to a program including cooperation with the agencies of Fairfax County in every way which will further mutual objectives. Responding to your request, I offer the following comments:

(1) Your report is titled "Western County Development" and is concerned with the need for early approval of a plan and policy to guide development in the undeveloped areas of the County. All of that part of the county which can be approximately defined as lying south and east of Rolling Road and the Braddock Road and which is included in the watersheds of Pohick and the several lower tributaries of Occoquan Creek and Bull Run is relatively undeveloped and, I believe, should be included in consideration of the subject of your report. The topography, natural resources, and beauty of that area are, in some respects unequalled in the undeveloped areas of the county except perhaps by some parts of the Difficult Run Watershed. In brief, my point is that "Western" does not accurately define the undeveloped areas. I know of the present interest of your office in the Pohick watershed and only suggest that that general area be included in statements and publications referring to or defining undeveloped areas.

(2) I have some general knowledge of the suggestions which have been made from time to time during the last ten years to guide and

control land use in Fairfax County including proposals that development be so controlled as to result in: (1) concentric belts around the metropolitan center of alternating intensive development and open spaces, (2) radial corridors with intervening wedges of open space, and (3) the "satellite cluster." Most recently I have read of the "rib and spine" concept expressed in Montgomery County. Without assuming a competence in the field of planning which I do not possess, may I say that in my opinion the answer will turn out to be some combination of these various concepts with much adjustment to very practical considerations, such as the formidable pressures that can be generated by private enterprise, and that undue emphasis on geometric projections should be avoided.

(3) If I understand it, and I think I do, I believe that the cluster concept will encourage a greater consideration by private enterprise of the goals and recommendations of planning agencies and will facilitate realistic adaptations of broadly stated planning objectives and definitions when very practical considerations indicate the need for such modification as development proceeds. More specifically I believe that the cluster concept as expressed by the plans for the Reston development offers the greater possibility of effective preservation and use of natural resources by a developer within a development. I refer for example to the Reston plans to make significant use of water resources by impounding, and to preserve natural cover and small open spaces throughout the development. I also think that the cluster concept offers the greatest hope of preservation of natural resources in the regions between centers of intensive development and, finally, as you have suggested, the cluster concept seems most likely to preserve some opportunity for modification of planning objectives in the event that experience or unforeseen events or forces indicate the need for a second look.

(4) The experience of the soil conservation service and my own observations have led me to a conclusion that, in general, insufficient consideration has been given to the watershed as a basic natural unit to which planning for land use should be specifically related, and I believe that is particularly true in areas such as Northern Virginia. I believe that you are informed by our recent discussion of the opportunity for early planning in the Pohick watershed of the readiness of the soil conservation district to work with your office for the achievement of mutual objectives.

(5) I am glad to see recognition in your report of evidence that Fairfax County will not continue indefinitely to be considered only as

a bedroom community. As a matter of fact it is not now so limited and will most certainly become increasingly self-sufficient in many respects as time passes. It will also move toward greater cooperation with the other two counties in Northern Virginia in matters where regional planning and action will be essential.

The jurisdiction of the Northern Virginia Soil Conservation District includes Loudoun and Prince William as well as Fairfax Counties, and for that reason our Board has a particular interest in regional planning. Fairfax County is not an island and will inevitably be affected by progress or the lack of it in the adjoining counties which are now confronted with almost all of the problems with which Fairfax County has been struggling for ten years.

Sincerely,

Laurence Mitchell

LM/tt

NATIONAL CAPITAL TRANSPORTATION AGENCY

UNITED STATES OF AMERICA
WASHINGTON 25, D.C.

April 16, 1963

Mr. R. H. Payne, Jr.
Principal Planner
Planning Office
County of Fairfax
Fairfax, Firginia

Dear Mr. Payne:

I am enclosing a later version of the staff working paper on cluster development and mass transit. While this is still a draft paper, you may reproduce it in whole, including the explanation that it is a "Draft Working Paper of the NCTA Staff".

Sincerely yours,

Bob

Robert A. Keith
Acting Deputy Asst. Administrator
Planning & Finance

Enclosure

(A DRAFT WORKING PAPER
NCTA APRIL 1963)

ADVANTAGES OF CLUSTER DEVELOPMENT FROM THE MASS TRANSPORTATION STANDPOINT

Cluster development can offer the advantages to the public of better mass transit service at lower cost and to the transit operator a more efficient system. Modern rapid transit can be designed to serve either sprawl or cluster development but a more efficient transit system would result from cluster development.

Clusters of higher density development and high quality mass transit are bound together in a two-way relationship -- the existence of good rapid transit service can encourage the development of higher density housing; and higher density residential areas adjacent to transit stations will produce a high number of transit trips both to downtown and to other more distant concentrated centers convenient to transit.

A well planned cluster community with high density residential development grouped about a combined transit station and moderate size commercial center complex (offering some employment opportunities) can further reduce the amount of vehicular traffic congestion as many people could walk to shop, and even to work. A major employment concentration, such as a government office facility, within easy walking distance of a rapid transit station can attract to transit intra-corridor riders and peak hour reverse flow riders which produce considerable extra revenue with very little extra cost.

High density residential development is taking place in the suburban areas at a much faster rate than in the 1950's, and the more this development is concentrated in areas easily served by rapid transit, the greater will be the benefits to the community of reductions in travel times, costs, and congestion. By attracting more travel to transit, the suburban highway travel can be kept at more manageable levels.

Typical Cluster Details

Higher density residential development permits more people to have good transit service for a given length of transit line because more people can live closer to the transit station. (See Illustration No. 1.)

Within a one mile radius of a transit station 7,600 persons could be housed at a low sprawl density of 3.8 persons per acre and the same area could hold 22,000 at a heavier sprawl density of 11 persons per acre.

Assuming uniform density, the average distance to the station in both examples would be 0.7 miles. However, by concentrating the residential development near the center of the same circle the average density can be reduced dramatically while maintaining acceptable density levels in the concentrated area. For example, while maintaining the same average density of 11 per acre for the entire circle, 11,000 or half the people could live within .3 miles of the station at 60 persons per acre. The average distance to the station for the entire circle in this example would be .25 miles, well within acceptable walking distance for most people.

To be available to as many residents at lower densities, either longer transit routes with more stations are necessary with subsequent penalties in capital and operating costs, or passengers must travel longer distances by feeder bus or automobile to reach the station. This means a smaller proportion of their trip would be made on the rapid transit trunk line and the overall transit trip would require more time, thus discouraging some transit riding. Where typical sprawl densities exist few persons can walk directly to stations.

Cluster Variations

Not all clusters would have similar land use combinations. Assuming adoption of cluster policy, the type of station area development along any one transit line can still vary considerably from predominantly residential to predominantly commercial and at some stations the only development would be large park and ride facilities.

Most clusters would be predominantly residential but with some shopping, banking and related activities. Some, however, might have no commercial. Many clusters would have transit parking facilities, but some would have none.

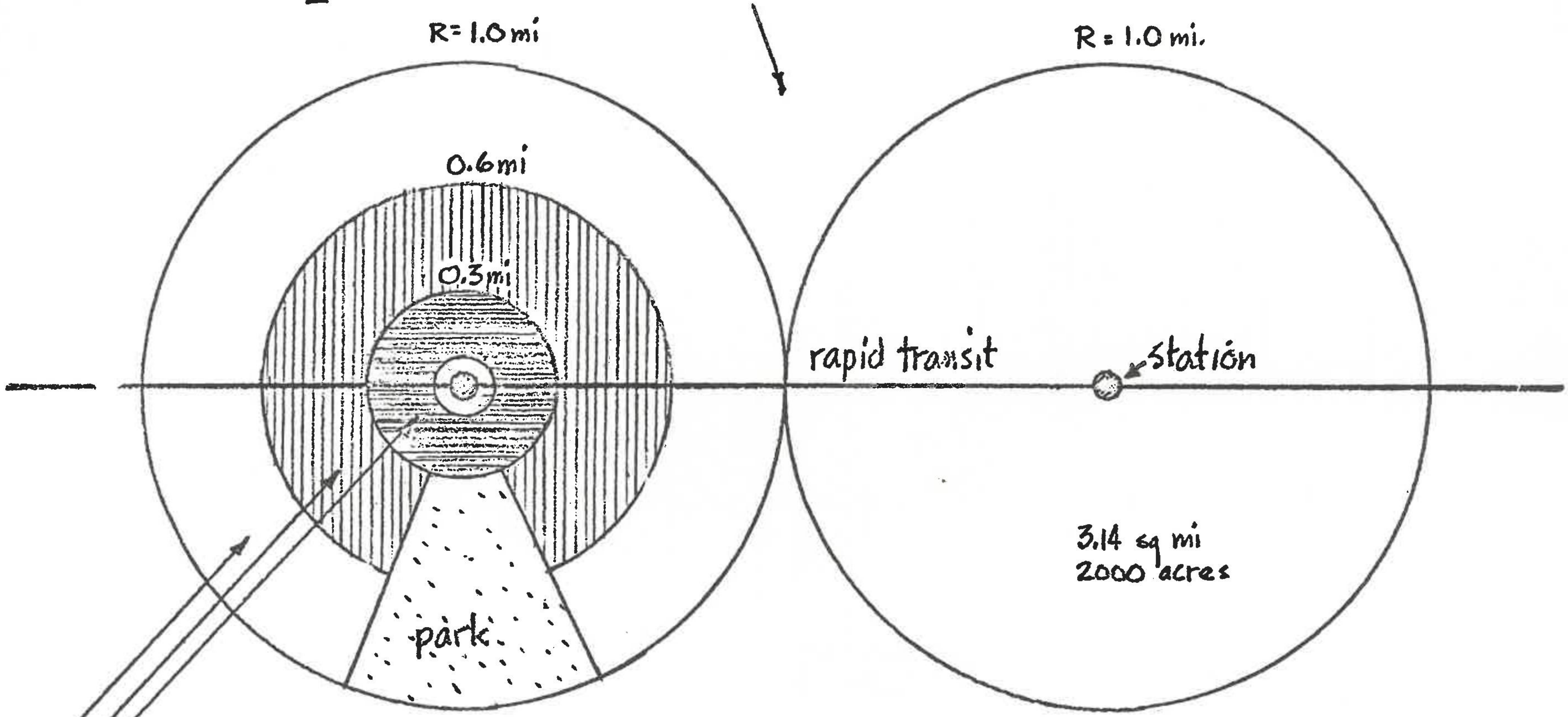
The predominantly commercial clusters would primarily contain office buildings with their related shopping activities. Regional shopping centers would seldom be situated at a rapid transit station.

Some transit stations might have no cluster development when large park and ride facilities are desired. These stations, usually provided to serve existing low density development or to achieve some land use objective, would require a superior arterial street and highway system.

High density developments centered on a rapid transit line are, however, not to be viewed as the only solution for clusters. Because of topography, existing development, and availability of transit rights-of-way, it is not possible to locate all the high

or medium density development within walking distance of rapid transit stations. Off-center clusters will be necessary and will be only a little less desirable than "on-center". Feeder buses can serve this off-center type of cluster development -- particularly if the housing and street systems are planned to permit good access to buses and local commercial and other development activities adjoin the transit station. The off-center cluster might be thought of as a version of the "spine and rib" concept of development. The mass transit spine would consist of a high speed trunk line with relatively long station spacing offering what amounts to be a continuous horizontal elevator service to downtown points, while the majority of the passengers would come along the ribs to the transfer stations by automobile and special buses which meet all trains.

A larger cluster (see Illustration 2) housing up to 100,000 persons would justify two stations and with the pattern of development shown in the illustration about 40,000 people could be within one-half mile ofa station and the entire population of the cluster within 5 to 10 minutes drive of a station. (This assumes kiss and ride facilities and feeder bus at both stations, and park and ride at one station only.)



High density 60 persons/acre		11,000 persons
Medium density 14 persons/acre		6,500 persons
Low density 3.8 persons/acre		4,500 persons
	Total	22,000 persons

Average density for cluster 11 persons/acre
Average distance to station .245 miles
Station Spacing = 2 miles

SMALL CLUSTER

Uniform density residential development:

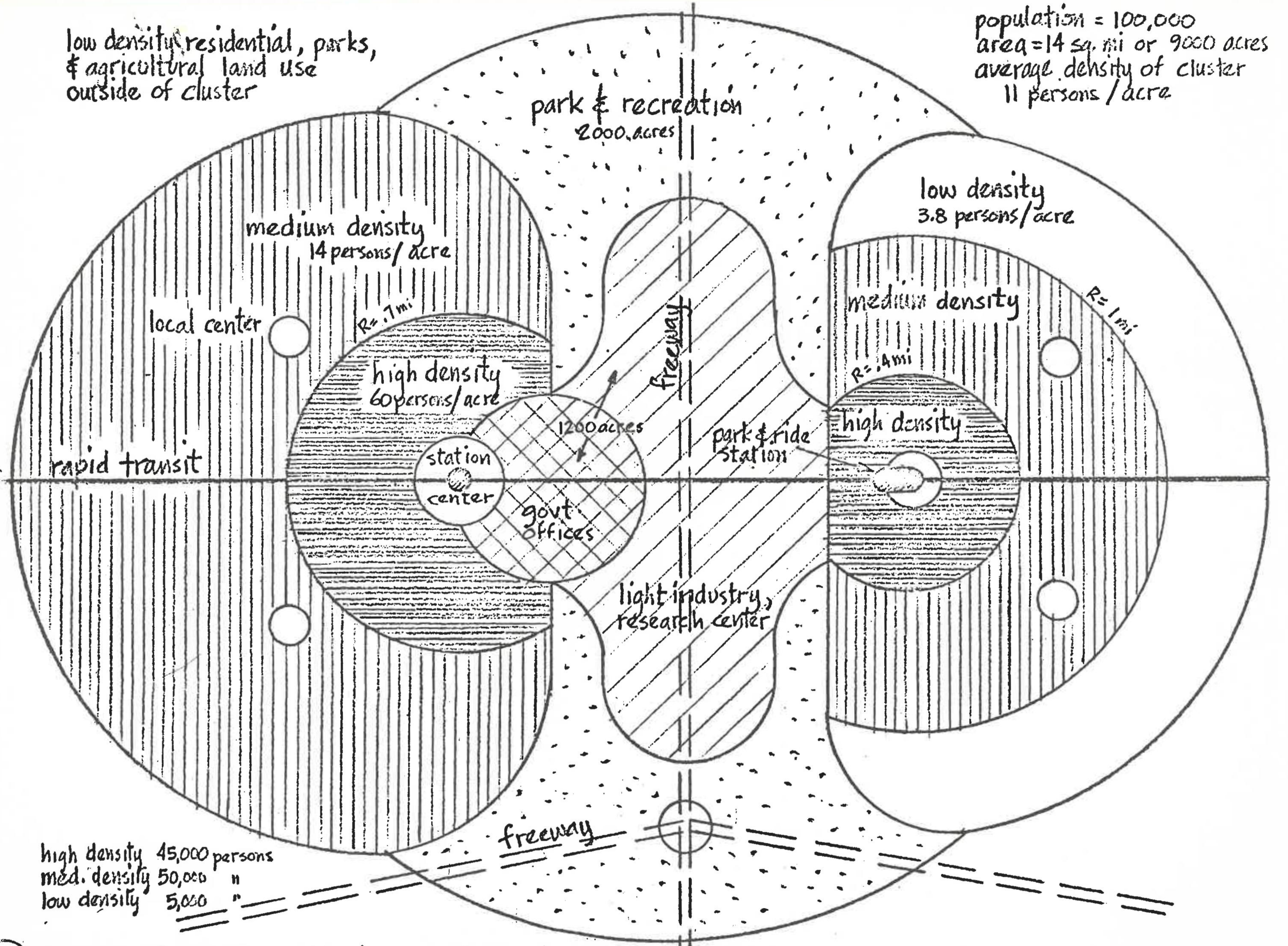
(1) At 11 persons per acre population equals 22,000 persons and avg. distance to station equals .7 miles

(2) At 3.8 persons per acre population equals 7600 persons, at same avg. distance to station.

SPRAWL

(1)

NCTA 2" = 1 mi.



7) LARGE CLUSTER (residential planned community)

FAIRFAX COUNTY, VIRGINIA

MEMORANDUM

TO: Rosser Payne
Master Plan Office

DATE May 24, 1963

FROM: Harry L. Hale
Sanitary Engineer

FILE NO:

SUBJECT: Suburban Cluster Plan

REFERENCE:

The following comments are forwarded for your information after reviewing the sanitary sewer portion of the Suburban Cluster Plan. We have not evaluated your cost figures in this review.

We are in full concord with the fact that having an adopted plan of any type certainly makes the design of a sewerage system more complete and accurate. This is predicated, however, upon the adoption of a plan and not changing this plan every few years.

The present policy for the design for sanitary sewers is not a flat 10 people per acre, the design of the sanitary sewer system must relate topography, existing development, over all anticipated development and then the factors of present and future water consumption and the relative peak flows must be applied to arrive at a reasonable design size. I have yet to see an over designed sewer and I think this is evident from past experiences. If a flat design factor were currently used it would be perhaps in the neighborhood of 12 people per acre rather than 10 due to the factors previously mentioned.

In theory, if a system were designed on 10 people per acre and the exact 10 persons per acre could be so located, taking into consideration the unusable property: roads, parks, stream valleys and so forth; then perhaps an ideal situation would occur. Unfortunately, the engineering science with the best possible estimates and development plans, which are subject to change, does not permit such ultimate design.

Your analysis on page 7 of this study would have been more realistic with the consideration of variable design slopes particularly in the instances of pipe sizes 12 inches and up. A one percent slope is extremely good and the changes that occur with minor slope changes in the larger pipe sizes make an enormous effect on capacity.

Stated on page 8 of your report is again the indication of present Board policy of 10 persons per acre, which is not the case. You are aware of the fact that only recently the Board indicated a design factor on the Upper Difficult Run on 3.6 people per acre. Variable factors have been applied in many instances of design in the past in the County.

We would also question a flat statement to the effect that the larger tracts of land will never be sewered due to the economics. This factor is perhaps true today, but in the years hence the economics may not be the prime factor as in regards to the public health. It is without a doubt the consensus of opinion that the septic tank disposal systems are only considered temporary facilities regardless of the type of construction presently provided.

We have always agreed to the effect that a comprehensive land use plan should preceed the sanitary sewer design. It is apparent to us, however, that this has not happened in Fairfax County and with the tremendous growth and pressure for development it is difficult for us to see how this can be accomplished unless a complete stoppage of development regardless of sewerage disposal system were made and time be allowed for the development and adoption of such a plan. This, of course, would be difficult to do in these areas which are available or soon will be available to sanitary sewers now under construction. However, considering the allowances for these developments only shortens the time when adjoining developments would begin to be considered and requests for zoning changes made.

Basically, as has been stated to you many times, we are sincerely in accord with the problem of tieing the engineering and planning efforts together to provide the best facilities we can and we certainly wish to cooperate in every possible way to this end.

HLH:jf

COMMONWEALTH OF VIRGINIA

COUNTY OF FAIRFAX

FAIRFAX, VIRGINIA

May 29, 1963

DEPARTMENT OF PUBLIC WORKS
DIVISION OF STREET DESIGN
AND INSPECTION

Mr. Rosser H. Payne
Principal Planner
Master Plan Office
Fairfax County, Virginia

Re: Drainage - Suburban Cluster Plan

Dear Ross:

Please excuse this delay in replying to your comments on your mark-up copy on that portion of your report for Cluster vs Suburban Sprawl relating to drainage.

You will recall that during our meeting in your office with Messrs. Hale and Leidl, I advised you that it was my opinion that the ultimate drainage improvements necessary within the stream valley flood plains would cost as much under the plan for suburban cluster, and in all probability exceed, the cost, as it would under the present type of development that you refer to as suburban sprawl. I know of no practical approach to this problem other than the one that was outlined to you during our discussion last month, and I feel that we would be misleading the public if we did not explain to them that this type of development could be more expensive than the present or conventional development. Any time you improve any properties along a drainageway, you change the character of run-off, the frequency of run-off, and therefore, change the time of concentration within any given watershed. This, in turn, results in many changes in the stream valleys including destruction of vegetation, changes in stream alignment due to erosion, siltation within the natural flood plains, and in some cases, damage to the existing bridges or roadway crossings. It is conceivable that with the development of highly impervious areas that you could experience several major peak flows from the same storm, and it is quite possible that these peaks could join during a major flood stage, and require channel improvements larger than anything that we have experienced to date.

I agree with your statement that the additional cost of storm drainage facilities would eventually be paid by the citizens or property owners of Fairfax County, however, we can not overlook the fact that where permanent storm drainage facilities are not provided, the citizens of the County are

faced with constant, costly maintenance of the drainageways which can exceed the cost of providing a permanent adequate storm drainage system. In the case of Pimmit Run, we are presently developing plans for a maintenance improvement program that will protect natural flood plains for a one-year storm, with the full knowledge that this design storm can be exceeded several times each year, and that the actual elevation of the flood plain will not be materially reduced. It is my considered opinion that the delineation of flood plains alone is not the ultimate solution to protect natural drainageways or preserve stream valleys, and that some day, we will be faced with a maintenance improvement program for all of our streams, such as we are planning for Pimmit Run at this time. It is difficult, and in some cases impossible, to provide for the adequate disposition of stormwater drainage in areas where the land use is constantly being changed by rezonings.

Recently, we started our review of the plans for the Reston development, which in theory, will provide the latest and best thinking for this type of land development. We have found (after consultation with the County Soil Scientist) that many of the drainageways which they wish to preserve in their natural condition, must be stabilized because of topographic and soil conditions. This, in itself, is contrary to the wishes of the architects and planners for this development, and they advise us that when such improvements are required, the intent and purpose of their planning is defeated because they wanted to preserve the natural drainageways. If this is the case, then the intent and purpose of their planning would be defeated with or without the stabilization or storm drainage systems, because the soil conditions are such that the drainageways will be subject to serious erosion, and that the ferns and trees, which they hope to preserve, will be undermined and destroyed as their development progresses. Mr. Coleman has already observed the affects and damage on the natural drainageways that have resulted from the clearing of the land for the purpose of developing pastures on the up-stream properties.

Under our present subdivision control and site plan requirements, the majority of the flood plains are being left in their natural state except where critical velocities are determined, and the remaining drainage is in permanent storm drainage systems. We feel that with the changes in zoning and with the continued development of the up-stream watersheds, that channel improvements will be required within the flood plains wherever the soils are subject to erosion, and wherever the flood elevation increases to a point where it damages the adjoining property.